that in this country too our butterflies are up later and to bed earlier than our birds. Dr. Longstaff and Mr. Annandale have made statements supporting this.

(*To be continued.*)

Myrmecophilous Notes for 1912.

By H. St. J. K. DONISTHORPE, F.Z.S., F.E.S.

FORMICIDÆ.

Subfamily Ponerinæ.

Ponera coarctata, Latr.—On May 30th a number of ☿ ☿ were found in a nest of *Formica fusca* at Box Hill. Six of them were introduced into a *fusca* observation nest from Tiree, where they lived for a few months, till they eventually died. They were never attacked by the *fusca* ☿ ☿, although they moved about freely in the nest. When a *fusca* ☿ met a *Ponera*, she simply tapped it with her antennæ. In July ☿ ☿ were found under stones on the edge of the Deal sandhills.

On September 5th I went to Box Hill to try and find ♂ ♂, of which I did not possess any specimens. Searching in moss and under stones, where the species usually occurs there, being unsuccessful, I started to sweep the herbage round about. There success rewarded my efforts and I captured a ♂ in the first sweep. After this specimens were swept up for about an hour, when they ceased to appear. Only one ♀ occurred and she had lost the wings on one side, evidently having been fertilized. When placed in a tube with a ♂, the latter endeavoured to embrace her without success. As far as I am aware the ♂ of *P. coarctata* has not been taken in Britain by anyone else now living.

The ♂ of *P. punctatissima* has not yet been found here. I have looked for it carefully in the British ant collections at Oxford and the British Museum, etc., as being apterous and very ergatoid it might well have been mistaken for a ☿. Emery[1] gives a good figure of it in a paper on ergatoid males.

Subfamily Myrmicinæ.

Myrmecina graminicola, Latr.—On Sept. 5th I found a small incipient colony of this interesting little species at Box Hill, in a nest of *Myrmica scabrinodis*, under a stone. It consisted of a deälated ♀ and 8 ☿ ☿, which were situated in a small chamber in the middle of the *Myrmica* nest. On the same day I swept a large number of *M. graminicola* ♂ ♂ in company with the *P. coarctata* ♂ ♂ recorded above, but no winged ♀ ♀ occurred. I may mention that many *Proctotrupidae* were also swept, some with dark wings like the *Myrmecina* and some with clear wings like the *Ponera*, which, respectively, much resembled both species. On September 7th I found a ☿ of *M. graminicola* in a nest of *Lasius flavus* at Sandown, Isle of Wight. I[2] have before recorded many instances when this ant has occurred with other species. It seems probable that the ♀ of this species may often seek the protection of another ant's nest to found her colony.

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[1] *Festsch.*, f., J. Rosenthal, Leipzig, 1906, p. 37.

[2] *Ent. Rec.*, 1909, p. 258, 1912, p. 4, etc.,

Wheeler[3] records the American sub-species of this ant as also being found in other ants' nests.

Formicoxenus nitidulus, Nyl.—On May 17th I found a deälated ♀ and one ☿ in a nest of *Formica rufa* at Nethy Bridge; this is its first record for Scotland. It is evidently rare there, as I spent five days in digging up and sifting *rufa* nests thoroughly, all over the district, and these were the only specimens I found.

Fired by my success with *Ponera* ♂♂ at Box Hill, on September 6th I went to Weybridge to try and find ♂♂ of this species, which I had also never captured before. As soon as I got to a *rufa* nest in which I have always found deälated ♀♀ and ☿☿ of *F. nitidulus*, I observed a ♂ running on the top of the nest. The day was cloudy and dull, just such a day as Wheeler[4] describes, when he found ♂♂ in the Upper Engadine.

Further work at the nest produced more ♂♂, but no winged ♀♀ were found (I have only once taken the winged ♀, at Bournemouth in 1906), but deälated ♀♀ and ☿☿ were numerous. When some of these ♀♀ were enclosed in tubes with ♂♂, the latter immediately climbed on their backs, grasping them round the thorax with their short mandibles. Some of the ♂♂ endeavoured also to get *in copula* with the ☿☿, as is also recorded by Wheeler. The ♂ is easily recognised by its longer antennæ, which are somewhat bent when alive, and by its more active and restless habits.

Anergates atratulus, Schenck.—On July 23rd Crawley and I found an *Anergates-Tetramorium* colony in the New Forest. Three ♂♂, a large number of winged ♀♀, one obese ♀, and a number of larvæ of the *Anergates* were taken. We have dealt at length with this important discovery in our paper read at the Congress at Oxford, and elsewhere.

Myrmica scabrinodis, var. *sabuleti*, Meinert.—Full details of this variety, will be found in my paper[5] on the genus *Myrmica*. I took ☿☿ at Box Hill, on May 5th, and ♂♂, ♀♀ and ☿☿ in nests in the same locality in September, and in the New Forest in July, and at Seaton in Devon with Crawley in August. Hamm has sent me ☿☿ which he took at Shotover in 1903, which were named *lobicornis* for him by Saunders (a determination with which he, Hamm, could never agree), and again in 1905. I have also seen ☿☿ sent to me to name by Bedwell, the locality of which I do not know.

Myrmica ruginodis, Nyl.—Colonies of this species were found on the Isle of Mull and in plenty on the Isle of Tiree in April.

Leptothorax acervorum, F.—G. A. Brown showed me a colony of this ant in a stump at Coatbridge, N.B., in April. (Records of common species like this and the one preceeding, are only given to extend our knowledge of their distribution in Britain). At Nethy Bridge, on May 19th, a solitary deälated ♀ was found under a stone.

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[3] *The Amer. Nat.*, xxxv., 1901, p. 519.

[4] *Jour. f. Pyschol. u. Neurol.*, xiii., 1908, p. 430.

[5] *Ent. Rec.*, 1913, p. 43, etc.

Various colonies were observed there, as usual, under bark and stones, and the ♀ ♀ (a fact which I have often noticed before, and which is recorded by Forel[6]), as well as the ☿ ☿ carry the larvæ and pupæ, and remove them into safety, but Hamm tells me he has seen the ♂ also carry the larvæ! In July a colony consisting of ♂ ♂, ♀ ♀ and ☿ ☿, was found under a stone on a *rufa* nest in the New Forest. Instances[7] of this ant in other ants' nests have often been recorded before. On September 14th a small colony was found at Weybridge inhabiting a fallen oak-apple. It consisted of a single deälated ♀, 73 ☿ ☿, and a number of larvæ.

Leptothorax tuberum var. *tubero-affinis*, Forel[8].—Crawley and I found a number of colonies of this variety in the New Forest in July. They were situated under stones, often in connection with *Tetramorium* nests, and contained ♂ ♂, winged and deälated ♀ ♀, ☿ ☿ and brood, and in one or two a single deälated ♀ and ☿ ☿.

Subfamily Dolichoderinæ.

Tapinoma erraticum, Latr.—On May 12th a colony of this ant was found under a stone on a bank at Woking, which consisted of three deälated ♀ ♀, ☿ ☿, larvæ, and a large number of ♂ and ♀ pupæ, and some ☿ pupæ. I took home the whole colony and established it in a plaster nest, hoping to rear the winged sexes of which I do not possess British specimens. In spite of the fact that the ants were supplied with plenty of food, they devoured all the ♂ and ♀ pupæ. A number of the ☿ pupæ were reared and the colony is still in good condition to-day (January 26th), and eggs and young larvæ are now present. Forel[9] also records that ☿ ☿ devoured ♂ and ♀ pupæ in captivity, and only reared ☿ ☿. On July 23rd Crawley and I found a large colony of this species under a stone in the New Forest in which over twenty deälated ♀ ♀ were present.

Subfamily Camponotinæ.

Lasius niger, L.—A marriage flight of this ant was noticed at Woking on September 26th.

L. niger var. *alieno-niger*, Forel.—Several colonies of this variety were found at Weybridge in September containing ♂ ♂, winged ♀ ♀, and ☿ ☿. Harwood sent me ☿ ☿ from Clacton-on-Sea, and ♂ ♂ and ♀ ♀ from a marriage flight observed there on October 12th. These, on examination, proved to be this variety. It is intermediate between *niger* and *alienus* in size, colour, and the pubescence on the tibiæ, etc. Forel[10] says it is nearly as common as the typical forms.

L. niger sub-sp. *alienus*, Först.—Colonies were found at Woking, Sandown, and Blackgang, I. of W., and at Seaton, Devon. Both

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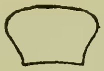
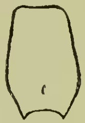
[6] *Fourmis de la Suisse*, 1874, p. 339.
[7] *Ent. Rec.*, 1906, p. 317, 1912, p. 5, etc.
[8] *loc. cit.*, p. 86.
[9] *loc. cit.*, p. 335.
[10] *loc. cit.*, p. 47.

Allen and H. C. Champion sent me specimens from the Lizard, Cornwall.

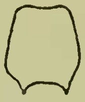
L. umbratus sub-sp. *mixtus*, Nyl.—I have a few more localities for this sub-species. Harwood sent ☿ ☿ to me, among some ants to name from Colchester, Best Gardner from Bourne End, Bucks., and Hallet a deälated ♀ taken on the road in March at Cwyrt-yr-ala, in Glamorgan. In my[11] paper on *mixtus* there is an unfortunate error, which also occurs (no doubt unintentionally), in Forel.[12] In the table for the ☿ he gives as one of the distinctions between *flavus* and *umbratus* and *mixtus*—1. "Ecaille . . un peu plus large en bas qu'en haut" = *flavus*. 2. "Ecaille plus étroite au sommet qu'à la base" = *umbratus* and *mixtus*. This I translated—1. "Scale a little broader at the base than at the apex," and 2. "Scale narrower at the apex than at the base," which, of course, means the same thing. The scale is broader at the apex in *flavus*, and narrower in *umbratus* and *mixtus*. I give a rough sketch of the scale of ☿ ☿ of the three ants in question.



Flavus ☿



Umbratus ☿



Mixtus ☿

L. umbratus var. *mixto-umbratus*, Forel[13].—Several colonies were found at Weybridge this year, and in September ♂ ♂ and winged ♀ ♀ were secured. This variety is intermediate between *umbratus* and *mixtus*, the hairs on the tibiæ not being nearly so pronounced as in *umbratus* proper, etc. On July 18th I dug up a *L. alienus* nest at Weybridge and found that the queen of the colony was what at the time I took to be a deälated ♀ *mixtus*. Since she has died I have found that she belongs to the var. *mixto-umbratus*. The colony, which contained many large and small cocoons, was carefully dug up and taken home where it was established in a plaster-nest. All the cocoons hatched, the large ones proving to be winged ♀ ♀ of *alienus*, and the small ones of course ☿ ☿. The *mixto-umbratus* ♀ was very active, being exceedingly rapid in her movements, and very excited when first dug up. She laid eggs on August 7th and was always treated as their queen by the *alienus* ☿ ☿, who fed and cleaned her and attended to her brood. By September 1st small larvæ had hatched, and to-day a number of larvæ are present. The ☿ ☿ killed some of their own winged ♀ ♀ on November 1st, when the *mixto-umbratus* ♀ was observed to be unwell, though carefully attended to by the ☿ ☿. She gradually lost the use of her legs, and in the end could only move her antennæ which she kept waving backwards and forwards. The ☿ ☿ cleaned her and carried her about, but on November 5th she was dead.

On August 11th, when I had the pleasure of Professor Wheeler's company, we found at Weybridge again, another *mixto-umbratus* ♀, as queen in a nest of *L. alienus*. These are instances in nature, where the ♀ has sought a nest of *alienus* in which to found her colony, and has been accepted by the ☿ ☿. It is probable that either the latter then killed their own queen, or the *mixto-umbratus* ♀ did so herself. I have before recorded[14] that I found some *umbratus* ☿ ☿ in a nest of *alienus* at Weybridge, on July 22nd, 1911, and suggested that a ♀ *umbratus* may have been present. From the above observations it is fairly certain that this was the case.

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[11] *Ent. Rec.*, 1911, p. 236.
[12] *loc. cit.*, p. 47.
[13] *l.c.*, p. 48.

Formica rufa, L.—On March 29th Crawley and I found a very large nest, which measured 6ft. across, at St. George's Hill, Weybridge. It contained vast quantities of ♂ and ♀ larvæ and cocoons. On April 17th I found ♂ ♂ at large on fir posts, at Wellington College. It is evident that the sexes were very early this year. Bignell[15] records winged ♀ ♀ on a nest on April 22nd, 1897, near Shaughbridge. The earliest date given by Forel[16] is May 30th.

F. rufa var. *rufo-pratensis*, Forel.—On September 8th I found two nests of this variety at Parkhurst Forest, I. of W. They were situated on a bank, and were constructed of finer materials than the *rufa* nests in the neighbourhood, and, in fact, looked more like *exsecta* nests. The ☿ ☿ were of a yellow-red colour with a neat black spot on the pronotum, this is very distinct in some specimens, which also have a smaller black spot on the mesonotum. I have seen specimens taken by Butler at Bexhill, and by Best Gardner in Glamorgan, and Wheeler tells me he found it at Lowood, on Lake Windermere.

F. sanguinea, Latr.—On July 10th an attack by this species on a colony of *L. umbratus* was observed at Weybridge. The nest of the latter was situated under a gorse root some twelve paces away from the *sanguinea* nest. A row of *sanguinea* ☿ ☿ stood outside the *umbratus* nest on guard, while others had penetrated under the root, and a large number of dead *umbratus* were lying about. Many of the *sanguinea* ☿ ☿ had ☿ ☿ of the attacked species fastened to their legs and antennæ. Forel[17] describes similar forays on colonies of *L. niger* and *L. flavus* by *sanguinea*. Wheeler[18] remarks that—" Even *sanguinea* shows a tendency to lapse into the ancient instinct of plundering the nests of different species of ants indiscriminately," and records a foray by the American sub-species *rubicunda* on a variety of *Myrmica scabrinodis*.

On July 15th, when again at Weybridge, a number of *sanguinea* ☿ ☿ were observed returning to their nest with *fusca* cocoons in their jaws. A few *fusca* ☿ ☿ were noticed in the neighbourhood in flight and on the top of grass stems, some with their own cocoons in their jaws, so evidently a genuine slave-raid had taken place.

F. exsecta, Nyl.—A small typical nest was found near Forest Lodge at Nethy Bridge, Inverness-shire, on May 5th. This is another new locality in Scotland for this species. I am pleased to say there are still plenty of nests in Parkhurst Forest, Isle of Wight.

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[14] *Ent. Rec.*, 1912, p. 7.

[15] *Ent. Mo. Mag.*, 1897, p. 141.

[16] *loc. cit.*, p. 408.

[17] *loc. cit.*, p. 363.

[18] *Bull. Amer. Mus. Nat. Hist.*, xxi., 1905, p. 11.

F. fusca, L.—On July 7th a ♀ was captured on the wing at Weybridge, and on the 18th naked ♀ pupæ were found in a nest under a stone in the same locality. Colonies of this ant were found on the Isle of Mull on April 26th, and in plenty on the Isle of Tiree. This species and *M. ruginodis*, recorded above, were the only ants I found in the latter island, although I was there from April 28th to May 2nd.

My friend Mr. Mitford gave me ☿ ☿ and deälated ♀ ♀ which he had taken at Rothes in Morayshire, one of the latter being a microgyne not much larger than a medium sized ☿.

All the races of *fusca* which have been recorded for Britain were found this year, though one will now appear under a new name.

F. fusca var. *glebaria*, Nyl.—First recorded for Britain by Crawley.[19] Crawley and I found a number of mound nests in the New Forest in July, ♂ ♂, one deälated ♀, and one winged ♀ being secured. I found an incipient colony in the top of a mound on July 22nd, which consisted of the deälated ♀ and some twelve ☿ ☿. According to Forel the ants from a colony we found at St. Issey, Cornwall, in April, 1911, also belong to this var.

F. fusca var. *rubescens*, Forel.—First recorded for Britain by the writer[20]. Colonies were found in July in the New Forest, and at Seaton in Devon, which contained many ♂ ♂, but neither winged nor deälated ♀ ♀ were obtained.

F. fusca var. *fusco-rufibarbis*, Forel.—First recorded for Britain by the writer[21]. Colonies were observed by Crawley at Seaton, and subsequently by myself when I was with him. I found others at Sandown and Blackgang Chine in the Isle of Wight, in September. When we have obtained more material and ♂ ♂ and ♀ ♀ of all the forms, we intend to work out and publish, if possible, more satisfactory distinctions for all these races. It is clear that in the ♂ of *rubescens* the scale is deeply cut out, more so than in any of the others, in *fusco-rufibarbis* it is widely but not deeply emarginate, and in *fusca* scarcely emarginate. I[22] have pointed out before that *fusco-rufibarbis* lives chiefly in the sand on the borders of rivers, lakes, and by the sea, and *glebaria* in the earth on the plains, *fusca* being more common in woods. This, however, is not sufficient to go by, since as we have seen *glebaria* occurred with *fusco-rufibarbis* at St. Issey, and *rubescens* with *fusco-rufibarbis* at Seaton, and *glebaria* and *rubescens* both occurred in the New Forest.

F. fusca sub-sp. *rufibarbis*, F.—This sub-species is very distinct, the greater number of the ☿ ☿ in a colony being partly bright red in colour, and might easily be mistaken superficially for ☿ ☿ of *sanguinea* or *rufa*. They are much more active than *fusca* or any of its forms, running about in a characteristic manner, and possess a distinct aromatic smell. The ♀ ♀ also are very distinct having much red about the head and thorax. I found three colonies this year at Weybridge, one of which was situated in a bank, and the other two under the turf, by the side of paths. The nests themselves were about a foot under ground and were reached by a very small entrance hole which was very difficult to find. On July 11th I noticed a ☿ run rapidly across the path and disappear into the herbage, and after a second had been seen and secured, the nest was found with considerable difficulty. When dug up it contained three deälated ♀ ♀, a large number of ☿ ☿, larvæ and pupæ. The colony was taken home, and one of the ♀ ♀, a number of ☿ ☿ and the larvæ and pupæ were established in an observation nest. The larvæ and pupæ have since hatched and all are well to-day. The second colony was discovered on July 18th, but was not dug up till August 11th, when it was hoped the winged forms might be present. This, however, was not the case. A third colony discovered in September contained two deälated ♀ ♀. I found that the ants in my observation nest accepted ☿ ☿ from the other colonies, also pupæ, which they brought up.

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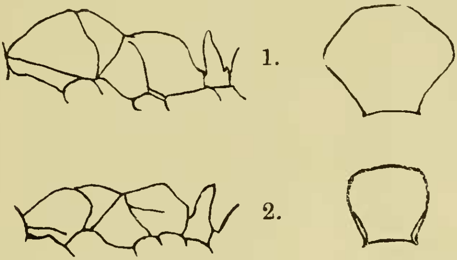
[19] *Ent. Rec.*, 1911, p. 96.

[20] *Zool.*, 1909, p. 466.

[21] *Ent. Rec.*, 1906, p. 217.

[22] *Entom.*, 1911, p. 391.

F. fusca var. *picea*, Nyl[23].—On July 23rd, Crawley and I found a colony of this var., which was situated in a clump of sphagnum, at Matley Bog in the New Forest. It consisted of a number of ☿ ☿, and large cocoons which all hatched later and proved to be ♂ ♂, unfortunately no ♀ ♀ were obtained, deälated or otherwise. This is the form standing in the British list, as the sub-sp. *gagates*, Latr. Smith[24] first introduced it as British in 1866 under the name of *gagates*, on a few ☿ ☿ taken by his son at Bournemouth. Farren[25] White rediscovered it at Bournemouth in 1872 and rightly stating it was distinct from *gagates*, he proposed the name of *glabra* for it. Saunders,[26] however, stated that he did not agree with White that it was distinct from *gagates*, and retained the latter name in his book[27]. In July, 1905 Arnold[28] found a colony in the New Forest, which is recorded as



Epinotum and scale of 1. F. gagates ☿. 2. F. picea ☿.

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[23] *Acta. soc. sc. Fennicae*, II., 3, 1846, p. 917.
[24] *Ent. Ann.*, 1886, p. 127.
[25] *Ants and Their Ways*, 1895, p. 234.
[26] *Ent. Mo. Mag.*, xx., 1885, p. 16.
[27] *Hym. Aculeata*, 1896, p. 22.
[28] *Ent. Mo. Mag.*, 1905, p. 211.

gagates. I detected a specimen in the Dale collection at Oxford, from Wareham, in Dorset. The ☿ of *picea* differs from that of *gagates* in the shape of the epinotum and scale. The epinotum of the former when seen in profile, is although slightly rounded, yet distinctly angled, whereas in the latter it is quite rounded. The scales are also very distinct, as will be seen by the accompanying sketches.

Emery[29] remarks that he does not possess a ♀ or ♂ of *picea* and from the descriptions there is nothing definite given to separate them from *gagates*. I possess a ♀ *picea* from Belgium kindly given to me by Bondroit and a ♀ *gagates* from Vienna, kindly given to me by Forel, and the scales are very different, much as in the ☿ ☿. In *gagates* it is excavated at the top and shaped like that of the ☿, in *picea* it is rounded. Unfortunately, I do not possess a ♂ of *gagates*. Emery[30] says the scale is not, or scarcely, cut out above. In *picea* ♂ it is evidently, but not widely nor deeply, emarginate. From *fusca* and the other forms, *picea* may be known by its more glabrous and shining body.

(*To be concluded.*)

In Sunny Spain.—July and August, 1912. (*With plate.*)

By ROSA E. PAGE, B.A.

(*Concluded from page 36.*)

The only house between Cuenca and Uña was reached about noon. Here we were most kindly welcomed, a table and other necessaries being provided for our lunch, which we had brought with us. Nothing but water is to be obtained at this half-way house and not a vestige of anything to eat is to be found *en route*, so that it is absolutely essential to carry with one the day's provisions. The charge for shelter and attendance was 25 centimes ; this included the stabling and feeding of the two donkeys. Very few insects were about, and these were very worn. Among them were *Melanargia lachesis*, *Colias edusa*, *Pontia daplidice*, *Agriades coridon* var. *arragonensis*, Gerh., and *Satyrus statilinus*, which was the only species in good order. Just before reaching Uña, however, we saw a few *Erebia zapateri* in a gorge. These were quite freshly emerged, and came as a great surprise, as we did not expect to see the species until we reached Bronchales.

We found Uña a dirty little village, most picturesquely placed, however, beside a small lake of the same name, which empties itself into the river Jucar by a fine waterfall, and is justly celebrated for its trout. We rested the night at the house of Señor Felix Gomez. Our host came in at dusk from the threshing field, received us most hospitably and saw to our comfort, and not until we were well through with our meal did he sit down to his own supper in a corner of the same room surrounded by his family, each dipping a spoon in turn into the pan which was placed in the centre. We had arranged to leave Uña at 5 o'clock the next morning, but no one in this land of "mañana" has the slightest idea of being hurried, so that it was fully three hours later before we could get away. We started as before, riding on the animal that had no baggage, but we had not proceeded far before we came across *Agriades coridon* var. *hispana*, H.-Sch.—hardly distinguishable on the wing from *A. thetis* (*bellargus*)—in fine condition, but mostly ♂ s. Dismounting, we were soon at work and able to take as many as we wished. Now appeared *Hipparchia briseis*, followed by *S. statilinus*, both in fine condition; *S. alcyone* only in fair order, *Pyrameis cardui Hipparchia arethusa*, *S. semele*, and *C. dorus* (very worn) sparingly.

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[29] *Deutschr. Ent. Zeitschr.*, 1909, p. 195.

[30] *loc. cit.*, p. 194.

Coenonympha pamphilus was common in patches at pools by the roadside. The last vestiges of *M. lachesis*, a few *P. daplidice* with an occasional *S. circe* skimmed across our path at intervals as we proceeded. At one place *A. coridon* var. *hispana* were in swarms resting on the damp sandy margin of the river, their brilliant wings glittering in the sunshine as they sipped the moisture from the yellow sand. This species occurred practically alone, only two *Hirsutina damon* being taken with it.

Along the road, at intervals, are small marshy areas in which we found *C. iphioides*, mostly worn, but a few good ones were netted. If we could have stayed to work them we could have taken plenty, they being more abundant here than at La Granja, where they showed signs of having been thinned. The bogs between Uña and Tragacete are practically virgin ground for this species. It was, however, necessary to press on in order to arrive at Tragacete by sundown.

At Tragacete we were delightfully entertained by Señor Indalechio Martinez. We decided to send our guide back to Cuenca with his two "burros," which were indeed quite unable to continue the journey even if the man had been conversant with the route to Bronchales. Señor Martinez promised to supply us with a mule and a horse and also to send his son Constantino with us as far as Albarracin if we would wait a day. We were very anxious to get an opportunity for setting, but the Tragacete people showered such attention on us (all the chief residents calling to see us) that practically none was done. They know here all about the discovery of *E. zapateri* by the late Canon Zapater and have an entirely inflated notion of the commercial value of the insect; this we did our best to remove.

We had decided to go on August 13th direct to Bronchales, a twelve hours' journey with a good mule. Of road, there was now none, in many places not even a track, and it would have been impossible to find one's way without a local guide. Soon after we had left Tragacete behind, *E. zapateri* began to appear across and along our path through the wooded ground of the Muelo de San Juan. Here they were not plentiful, but given more time we could have taken a nice series *en route*. Of a dozen which we netted, ten were ♂ s and two were ♀ s. All these specimens were fresh. Other species were similar to those noted before, with crowded patches of *Epinephele lycaon*, especially near the village of Charchaparilla, through which we passed. We saw *A. coridon* var. *hispana*, too, most of the way, but now not so plentifully, together with worn *Argynnis niobe*, *M. lachesis*, *S. statilinus* and *C. pamphilus*.

As we approached Bronchales in the evening, the air became cooler and cooler, a high wind arose, and as we commenced the descent towards Aragon, it gradually turned bitterly cold. Presently a sharp turn in the path revealed to us a grand view of the plains of Aragon, spread out far beneath us like a map, and after four days in the mountains it seemed quite strange to come into civilisation again. We had crossed right over the Sierras, a distance of about 80 miles. Constantino had been directed by his father to take us to the house of a friend, so that we were spared the horrors of the sack of straw, etc., as related by Mr. Sheldon (*Ent. Rec.*, vol. xviii., pp. 98). While we thawed in front of a large log fire in the kitchen, Constantino gave orders for our supper, which was ready about 9.30 p.m.—nine hours since our *al fresco* lunch. We were relieved to find our hostess a good cook, and the beds quite clean, although the fact that our host was the village butcher, and that his slaughterhouse was just under our window had to be ignored. By the way, future visitors to these villages are advised to carry their own dinner knives, as every Spaniard carries his own, and the entire stock in some of the houses in which we stayed consisted of one.

We found the *E. zapateri* ground about a quarter of an hour's walk from the village, and on August 14th we paid our first visit to it. We soon discovered them flying gently among dwarf oak scrub, their short flights broken by intervals of rest. Finding them easy to capture, but the oak shrub rather troublesome to our nets, we crossed to more open ground beside a tiny runnel of water, which trickled down a peaty slope. Here we found many more settling with outspread wings on damp spots, while others were feeding on quite dwarf flowers of autumn crocus, and on stunted sprigs of heather. They are difficult to rouse when feeding, the females feigning death or dodging under the net. We went back to lunch and then returned to the same spot about 3.0 p.m. The sun was still shining, the air being warm, and the *zapateri* ground sheltered. We however only took six specimens ; no others were to be seen in the identical spots we had worked in the morning. Other butterflies were also absent with the exception of a couple of worn *Parnassius apollo*. We resumed collecting the next day, the morning being cloudy with sunshine at intervals. We took a fair number ; some were flying, but many were at rest on the ground, on leaves of the scrub, and on chips of wood ; others were feeding on the heather. They often required rousing before they would fly, and then only flitted for a short distance, just over and among the herbage. We took one specimen this day with no eye-spots on the upper side of the primaries.

There was very little else about except *H. semele* and *Pyrgus proto*. The *zapateri* collecting was as pretty a bit as we had in Spain—the air delightfully cool, dry, and bracing ; the ground an easy saunter from the village, and sheltered from the wind, the glorious sunshine revealing through the pine woods on the slopes an extensive view of the apparently limitless "campo" of Aragon, some 3,000 feet below us. Bronchales should have a fine future before it as a health resort. As a matter of fact the Valencians are already aware of its virtues, and a large number of them were there at the time of our visit, making accommodation for the chance visitor rather precarious.

We left on August 16th, and with our guide Constantino Martinez, traversed the Sierras for some hours (a most delightful mule ride), until we struck the carriage road to Albarracin, and thenceforward the romance of our journey was over. Travelling along a road was a tame affair compared with crossing the glorious slopes above. We were now in Aragon and immediately noticed a difference in the type of people, dress, etc. We found Albarracin extremely hot after

Bronchales, and a distinct contrast to Cuenca, *e.g.*, no one is to be seen in the narrow Moorish streets of Albarracin after sunset, while Cuenca with its broader roads is quite lively up to midnight.

We were disappointed in finding we were too late at Albarracin, but having taken all the *Erebia zapateri* we wanted at Bronchales, we did not try the ground on which they are said to occur, so cannot say in what condition they were.

We saw nothing of Señor Narro during the three days of our visit and understand that he now drives the diligence to Teruel, so that he would not be available to conduct future visitors to Bronchales or Noguera. The posada at Albarracin, although clean and comfortable, is certainly the most insanitary house we have been in.

The diligence took us to Teruel in 5½ hours, thence we came home through Madrid.

We were surprised, on crossing the Guadarramas, to see the change in the weather. South of the range. threshing and winnowing were in full progress, with a certainty of dry air and continual sunshine; northward, the skies were dull and the air cold, and as we approached the Cantabrian Mountains the mists which rested upon them appeared very strange to our eyes after the clear air of Castile. All the rivers of France were in flood, and it was heartrending to see the stacks of corn standing sodden in the fields, reaping machines abandoned, masses of oats beaten down by the rain, and vines suffering from black rot.

The farther north we came, the worse things became; we crossed the channel in a gale and arrived home finding everything most dismal and depressing. We came to the conclusion that we had certainly been extremely lucky to have selected Sunny Spain for our holiday in the summer of 1912.

An Old Essex Collection.

By the Rev. G. H. RAYNOR, M.A.

(*Concluded from p. 12.*)

We have now come to the third and last section of this collection, including the four species of *Lithosia* previously omitted, and the whole of the *Noctuæ*. These latter are a very good representative lot, and nearly all labelled.

Having numerous correspondents in different parts of the country, Mr. Greenwood got together a very good lot of Northern species, but seems to have somewhat neglected his own neighbourhood. Perhaps he did not sugar regularly, although several of his correspondents seem to have done so.

Lithosia complana, (=*complanula*).—7.

Lithosia depressa, (=*complana*).—1.

Lithosia griseola.—6. One being the variety *stramineola*.

Lithosia quadra.—3. "Bromley Thicket, 1844." An interesting record of this species which now survives only in very large woodlands such as the New Forest. It has once been taken at Hazeleigh, and it used to be found in Epping Forest.

Gnophria rubricollis.—5. Four from Bromley Thicket, 1844 and 1845. One, Black Park, S. Stephens, 1846.

Cybosia mesomella.—2. "Carlisle, Hodgkinson, 1846."

The Noctuidae are:—

Triphaena orbona.—13. All very similar, and with few dark markings.

Triphaena pronuba.—11.

Triphaena fimbria.—7. Five from Weir of Camberwell, 1846, and one bred by him from Dulwich. The bottom one is labelled "dark variety, bred larvæ, Birch Wood, Spring," S. Stephens.

Triphaena interjecta.—6. Three H. Doubleday, Epping, 1846. Two Walton, 1843, A.G., and one Chelmsford, 1846, A.G. This species seems generally distributed in the county, but never common.

Triphaena janthina.—7. Four from Weir, Dulwich, 1846, one Ipswich, from Seaman, 1846, one Catchpool, Colchester, 1844, and one Chesterfield, July, 1846, Edleston.

Cerigo texta, (=*cytherea*).—6. Two Lewes, Thomson, 1846. Two Sherwood Forest, August, 1846, S. Stephens, one Peterborough, 1844, and one Tunbridge Wells, sugar, 1846, Weir.

Lytaea umbrosa.—6. Two Lewisham, August, 1846, Stainton, one Whitwell, Peterborough, 1844, one Edleston, Manchester, 1844.

Characas nigra.—1. Perthshire, August, 1846, Weaver.

Charaeas graminis.—2. One from Edleston.

Rusinia ferruginea, (=*tenebrosa*).—5. Black Park, August, 1845, and June, 1846, S. Stephens.

Agrotis corticea.—1. Clapham, Thomson, 1846.

Agrotis segetum.—14. Three from Chelmsford, September, 1846, October, 1846, November, 1846.

Agrotis suffusa.—13. All from Chelmsford, 1846, excepting two from Dulwich, Weir, 1846.

Agrotis valligera.—5. Two New Brighton, August, 1846, Edleston. One Seaman, Ipswich, 1846. One Carlisle, Hodgkinson, 1846, and one Banks of Solway Firth, August, 1846, Hodgkinson.

Agrotis radia (=*puta*).—8. One Chelmsford, 1842, A.G. One Chelmsford, 1845, A.G. Three Lewisham, August, 1846, Stainton. Two Penzance, Noye, 1846, and one Peterborough, Whitwell, 1845.

Agrotis tritici.—3. Two Devon, S. Stephens, 1846. One New Brighton, August, 1846, Edleston, and one with a similar label put under the name of *lineolata*, variety of *tritici*. This last is not striking, the transverse lines being very indefinite.

Agrotis aquilina.—2. Carlisle, Hodgkinson, 1846.

Agrotis nigricans.—2. One Chelmsford, 1843 or 1844. Banks of the Solway Firth, August, 1846, Hodgkinson. There are also specimens labelled *fumosa* dark variety of *nigricans*, all from Weir, Camberwell, 1846. Two of these are melanic, but the third is of the form which approximates closely to *Agrotis obscura*.

Agrotis exclamationis.—12.

Agrotis cursoria.—4. Two Carlisle, Hodgkinson, 1846. One banks of Solway Firth, August 1846, Hodgkinson, and one Edleston, 1844.

Graphiphora rhomboidea.—4. Two Epping, H. Doubleday, 1846.

Two Chesterfield, Edleston, August, 1846. This is another species occurring periodically in the Essex woodlands.

Graphiphora renigera or *cataleuca* (=*lucernea*).—1. Dover, August, 1846, A.G.

Graphiphora augur.—4.

Graphiphora ravida.—4.

Graphiphora brunnea.—9. Two Dulwich, Weir, bred 1846. Two Birch Wood, bred larvæ, S. Stephens, May, 1846. One Carlisle, Hodgkinson, 1846. Two Stainton, Torwood, 1846, and two Carron, Stainton, 1846.

Graphiphora triangulum.—7. One Witham, Walford, 1846. Two bred, Stephens, Birch Wood, May, 1846. Three Weir, Camberwell and Dulwich, 1846.

Graphiphora baja.—6. Weir, Dulwich, 1846.

Graphiphora dahlii.—6. One Dulwich, 1846, Weir. One Shirley, 1846, Weir, and four Torwood, N.B., August, 1846, Stainton, sugar.

Graphiphora festiva.—6. Four Dulwich, 1846, bred, Weir.

Graphiphora c-nigrum.—7. Two Whitwell, Peterborough, 1844. Two sugar, Hammersmith, August, 1846, S. Stephens, and one Chelmsford, Ransome, 1846.

On looking a little forward among the drawers I find that there are considerable series of most common *Noctuae* with almost every specimen labelled. As it seems hardly worth while to record all these localities, from this point I propose to mention only those that seem important or interesting.

Graphiphora plecta.—3. From Chelmsford, 1844.

Graphiphora bella (=*rubi*).—7. Three from Chelmsford, 1844, 1845, 1846.

Semiophora gothica.—11. One Chelmsford, 1844, and one Penzance, Curnow.

Orthosia instabilis.—13. None of them of Essex origin.

Orthosia populeti.—3. One Epping, H. Doubleday, 1846. One Doncaster, Hawley, 1846, and one Didsbury, bred, 1846, Edleston.

Orthosia munda.—10. Four H. Doubleday, Epping, 1846.

Orthosia gracilis.—7. Two Epping, H. Doubleday, 1846.

Orthosia stabilis.—10. One Witham, 1845.

Orthosia miniosa.—1. Labelled "North, S. Stephens, 1846."

Orthosia cruda.—7.

Orthosia litura.—18. Twelve of them Chelmsford, nine 1846, A.G.

Orthosia pistacina.—19. A nice varied series, including ab. *obsoleta* and a very fine rufous form with dark transverse markings. Most of them are from Chelmsford, September, 1846.

Orthosia lunosa.—8. Four Chelmsford, September, 1846.

Orthosia lota.—8. One Chelmsford, October, 1846.

Orthosia macilenta.—2.

Orthosia upsilon.—6.

Mythimna turca.—1. Black Park, Weaver, 1846. This species occurs in Essex at Epping and Brentwood.

Mythimna litharyyria.—7. One Chelmsford, 1846, and a specimen labelled Chesterfield, July, 1846, Edleston. This is a dull leaden unicolorous form with the transverse lines nearly obsolete.

Grammesia bilinea (*trigrammica*).—2.

Segetia xanthographa.—11.

Segetia neglecta.—4. Two Weybridge, September, 1846, S. Stephens.

Caradrina ambigua.—2. Brixton, Thomson, 1846.

Caradrina morpheus.—2. One Chelmsford, 1842.

Caradrina cubicularis.—9.

Caradrina glareosa.—2. Alderley, August, 1846, Edleston, and Solway Firth, Hodgkinson, 1846.

Glaea rubricosa.—9. Four Epping, H. Doubleday, 1846.

Glaea vaccinii.—5. Three of them Chelmsford, September, 1846, A.G.

Glaea subnigra (=*ligula*).—13. Seven from Chelmsford, October, 1846.

Mecoptera satellitia.—8.

Amphipyra pyramidea.—3. One Chelmsford, 1844, A.G. One Witham, Walford, 1846.

Amphipyra tragopogonis.—13.

Dipterygia pinastri.—1. From Seaman, Ipswich.

Naenia typica.—13.

Xylina rhizolitha.—4. One Chelmsford, October, 1846. One Ipswich, Seaman, 1844. Two Whitwell, Peterborough, 1844. This species is very rare in Essex; one specimen occurred at Hazeleigh, May 22nd, 1905. Mr. Harwood finds it very occasionally near Colchester.

Xylina putris.—6.

Calocampa exoleta.—From Peterborough, Doncaster, and Scotland.

Calocampa vetusta.—1. Perthshire, Weaver, 1846.

Lithomia solidaginis.—6. All from Manchester, Edleston, 1844 and 1846.

Xylophasia lithoxylea.—8.

Xylophasia sublustris.—2. From Weir of Camberwell.

Xylophasia polyodon.—10.

Xylophasia rurea.—9. One Chelmsford, 1846.

Xylophasia characterea (=*hepatica*).—5. Two Chelmsford, 1843 and 1844; and two specimens of the dark variety *combusta*, Preston, Hodgkinson, 1846.

Xylophasia scolopacina.—3. One Preston, Hodgkinson, July, 1846. Two Sheffield, Heppenstall, 1843 and 1846.

Xylophasia rectilinea. —1. Perthshire, June, 1846, Weaver, sugar.

Hadena adusta.—2. One Chelmsford, 1846, A.G.

Hadena gemina.—3.

Hadena thalassina.—7.

Hadena contigua.—1. Perthshire, June, 1846, Weaver.

Hadena glauca.—4. One Carlisle, Hodgkinson, 1846. Three Wharmton Moors, June, 1846, Edleston.

Hadena plebeia (=*dentina*).—6. One Witham, Walford, 1846.

Hadena lithorhiza.—4. One Witham, Walford, 1846, and a specimen with very dark mottled forewings, "Penzance, 1842, Curnow."

Hadena cucubali.—1.

Hadena capsincola.—3. Two Chelmsford, 1843.

Hadena protea.—12. One Witham, from Walford, and two Chelmsford, September, 1846.

Mamestra splendens (=*pisi*).—6. One Chelmsford, Ransome, 1846.

Mamestra oleracea.—8.

Mamestra suasa.—4. Fine large specimens, Doncaster, Hawley, 1846.

Mamestra brassicae.—8.

Mamestra albicolon.—1. Cheshire Coast, June, 1846, Weaver.

Mamestra chenopodii.—7.

Mamestra anceps.—2. Chelmsford, 1843 and 1845.

Mamestra persicariae.—4.

Euplexia lucipara.—7.

Hama basilinea.—6. Two Chelmsford, 1844 and 1845.

Hama testacea.—7. Three Chelmsford, 1843 and 1844.

Hama connexa.—6. Sheffield, Heppenstall, 1844 and 1846.

Apamea fibrosa.—3. Hammersmith Marshes, July, 1846, S. Stephens.

Apamea nictitans.—8.

Apamea unanimis.—3. All Chelmsford, 1843 and 1844.

Apamea didyma.—30.

Apamea ophiogramma.—1. Sherwood Forest, July, 1846, S. Stephens. This is about as badly worn a specimen of a *Noctua* as I ever saw, but it does not look like *ophiogramma*, which I fancy has never occurred in Sherwood Forest.

Acronycta megacephala.—5. All Chelmsford, 1844, 1843, 1844, 1846.

Acronycta psi.—8.

Acronycta menyanthidis.—1. Carlisle, Hodgkinson. A pretty variegated specimen, with pronounced dark fascia.

Acronycta rumicis.—6. Two Chelmsford, Ransome, 1846.

Acronycta euphorbiae.—1. "Perthshire, June 1846, Weaver. On rocks."

Bryophila glandifera.—1. Penzance, from Noye, 1846.

Bryophila perla.—10. Dover.

Thyatira derasa.—3.

Thyatira batis.—7.

Calyptra libatrix.—11.

Tethea bipuncta (=*duplaris*).—1. Kinloch=Rannoch, June, 1846, Edleston.

Tethea diluta.—10.

Tethea subtusa.—1. Manchester, July, 1846, Edleston.

Cleoceris viminalis.—2.

Cosmia diffinis.—2. One Chelmsford, 1845, A.G. One Witham, Walford, 1846. This local species still occurs regularly for many miles round Chelmsford.

Cosmia affinis.—3. Two Witham, Walford, 1846.

Cosmia trapezina.—17.

Cosmia fulvago (=*paleacea*).—1. Cumberland, August, 1846.

Xanthia fulvago.—9. Two Witham, Walford, 1846. In this series are two specimens of the variety *flavescens* labelled Dulwich, Weir, 1846.

Xanthia flavago. (=*silago*).—6. One Witham, Walford, 1846.

Xanthia croceago.—1. Dulwich, Weir, 1846. This species occurs regularly now-a-days amongst scrub-oak on many commons in the neighbourhood of Chelmsford.

Xanthia gilvago.—1. Yorkshire, Weaver, 1846. Now a common species among wych elms round Chelmsford.

Xanthia rufina.—7.
Xanthia ferruginea.—8. One Chelmsford, September 1846.
Xanthia flavago.—1.
Gortyna micacea.—9. One Chelmsford, 1844, A.G.
Nonagria typhae.—4. All Epping, H. Doubleday, 1846.
Nonagria crassicornis.—3. Hammersmith Marshes, September, 1846, S. Stephens.
Leucania comma.—3.
Leucania straminea.—2. One Hammersmith, 1846, Weir. The other "bred, larvæ Hammersmith Marshes, May, 1846, S. Stephens."
Leucania littoralis.—1. Cumberland Coast, Weaver, 1846.
Leucania obsoleta.—5. One Whitwell, Peterborough. Four Stephens, Hammersmith Marshes, June, 1846.
Leucania impura.—6.
Leucania pallens.—6.
Leucania pygmina, (=*despecta*).—5. Three Scotland, Weir, 1846. Two Brixton, Thomson, 1846.
Leucania geminipuncta.—2. Near Milton Park, Whitwell, 1844.
Phlogophora meticulosa.—13.
Cucullia lychnitis.—2. One from Weaver, another London, S. Stephens, 1846.
Cucullia verbasci.—2. One Witham, Walford, 1843. One Chelmsford, 1845, A.G.
Cucullia asteris.—1. Near London, bred Weaver, 1846.
Cucullia umbratica.—1.
Cucullia lactucæ, (=*chamomillae*).—3. Chelmsford, 1846, A.G.
Miana literosa.—1. New Brighton, August, 1846, Edleston.
Miana strigilis.—5. And eight of the variety *aethiops*, two of them Chelmsford, 1845 and 1846.
Miana humeralis.—4. And four *M. terminalis*, all being referable to *M. furuncula.*
Miana fasciuncula.—4.
Celaena haworthii.—1. Bolton, August, 1846, Edleston.
Scotophila porphyrea.—3.
Achitia piniperda.—2. One Black Park, April, 1845, S. Stephens. One Doncaster, Hawley, 1846.
Actebia praecox.—1. Carlisle, Hodgkinson, 1846.
Miselia oxyacanthae.—3. Two Chelmsford, October, 1845, A.G.
Miselia aprilina.—8.
Miselia conspersa.—1. Isle of Arran, May, 1846, Weaver.
Polia adrena.—3. One Chelmsford, 1843, A.G. Two Carlisle, Hodgkinson, 1846. This is still one of the special insects of Chelmsford and neighbourhood.
Polia nebulosa.—6.
Polia tincta.—1. Perthshire, June, 1846, Weaver.
Polia herbida.—2.
Polia flavicincta.—6. All Chelmsford, two 1843, one 1844 and three September 1846. A local insect, which still occurs freely at light at Chelmsford.
Polia dysodea.—5. All Chelmsford, 1843, A.G. This species, of which the caterpillar feeds on lettuce seeds in gardens, seems to be gradually becoming much more scarce, and is not known to occur at Chelmsford now.

Polia chi.—8.

Apatelia aceris.—5. Two Chelmsford, A.G., 1846. Three Witham, Walford, 1846, one of the latter being a large female with beautiful radiated hindwings.

Eremobia ochroleuca.—3. One Chelmsford, 1844, A.G. Two Dover, Leplastrier, 1846. An interesting record from Chelmsford so far back as 1844. The species still occurs periodically in the neighbourhood.

Abrostola triplasia.—1. From Seaman of Ipswich.

Abrostola urticae.—5. One Chelmsford, 1844. One Epping, 1842 and one Witham, Walford, 1846.

Plusia iota (=*v-aureum*).—3.

Plusia percontationis (=*iota*).—1.

Plusia interrogationis.—1. Perthshire, 1846, Weaver.

Plusia gamma.—6.

Plusia chrysitis.—7. One Chelmsford, 1846.

Plusia festucae.—2. Preston, Hodgkinson, May, 1846.

Heliothis peltigera.—1. Penzance, 1842. Looks like an immigrant.

Anarta myrtilli.—4. One Tiptree Heath, Essex, 1844. It still occurs there sparingly.

Anarta cordigera.—1. Perthshire, May, 1846, Weaver.

Anarta vidua (=*melanopa*).—2. Perthshire, June, 1846, Weaver.

Anarta heliaca.—1. Colchester, 1843.

Erastria uncana.—2. Horton Moors near Carlisle, June, 1846, Hodgkinson.

Erastria bankiana.—Killarney, Weaver, 1846.

Erastria fuscula.—2. Witham, Walford, 1846. Still occurs in this part of Essex, but is scarce.

Phytometra aenea.—5.

Acosmetia rufula (=*caliginosa.*).—1. A female, Dorsetshire, J.C. Dale, 1845.

Acosmetia arcuosa.—3.

Stilbia anomala.—1. Perthshire, July, 1846, Weaver.

Mormo maura.—8.

Catocala nupta.—8.

The Butterflies of Dauphiné.

By A. S. TETLEY, M.A., F.E.S.

Although the butterflies of Dauphiné have been pretty well worked by English collectors, some account of a month spent in that province during last summer may be of interest to past and to future visitors with the net. We left England on July 20th, and returned on August 15th. The weather was generally fine, for we got off with only three wet days; but the average day temperature was below the normal, and the nights, even in the lower parts, often very cold. A brilliant morning was frequently followed by a cloudy afternoon, and even when the sky was clear there sprang up after midday a strong westerly wind, which lowered the temperature and cleared the butterflies away as if by magic. The promise of an early season in April and May was completely falsified by the bad weather of June and early July, so that the later Satyrids and the second broods of other butterflies were decidedly behind time. The Alpine flowers were simply glorious, early and late summer plants all blooming together. At Le Lautaret we found narcissi, the spring gentians, lilies white and red, pasque flowers, and a thousand others, in such profusion as we have never seen anywhere in Switzerland during a series of visits from May to August in the Jura, the Oberland and Valais.

We went straight through to Aix-les-Bains, and set off on the morning of July 21st for Grésy and the road beyond. Heavy clouds after rain gave way to a bright warm day. The first butterfly to appear as the sun broke through the mists was *Melanargia galathea*, and I was glad to note among the swarms of the afternoon a good number of perfectly fresh specimens, a sign at this low level of a season not too advanced. This was borne out by the entire absence of the big Satyrids save for a single male specimen of *Enodia dryas*. *Nisoniades tages* was out in a second brood, dull in colour. A single *Lycaena arion*, worn to rags, was all I was to see of this "blue," except one at Clelles and another at La Grave ten days later. *Pieris rapae* was abundant for the only time in our tour, and *Epinephele tithonus*, all males, was everywhere about the bushes along the road beyond Grésy. We never saw it again till our last day at Guillestre. A single *Pararge aegeria* taken was very near the type form. *Dryas paphia* was seen once, noteworthy only for the fact that it was one of four which were all we came across anywhere. Another usually common butterfly, *Loweia* (*Chrysophanus*) *dorilis*, was taken close to Aix, and never turned up again.

In the evening we went on to Grenoble, and next morning (July 22nd) I went off to Clelles-Mens alone, to be followed later by my friend, who wielded a camera with much success and occasionally took a turn with the net. We had five days at Clelles, all fine but never really warm as one imagines it should be there in July. The butterflies of Clelles are well known, and I think we met most of the *habitués* of the place except the August Satyrids, *Hipparchia briseis*, *H. arethusa* and *Satyrus statilinus*, the last two of which we were fated never to see. The big Argynnids were very scarce, and there were no Vanessids except *Polygonia c-album* and *Pyrameis cardui*. And here I might at once say that we saw hardly any of this group anywhere, the record being *P. cardui* three times, *P. atalanta* twice, one *Euvanessa antiopa*, one hibernated *Vanessa io* at Château Queyras (larvæ half-grown there), *Aglais urticae*, very few, no *Eugonia polychloros*, and only one or two *Polygonia c-album*.

On July 24th, we climbed to the top of the long ridge that lies to the west of Clelles. The lower slopes, dry and stony and covered with lavender were alive with *Satyrus circe*, and *S. hermione*, swarms of *Epinephele lycaon*, bright red *Melitaea didyma* and lovely fresh *Polyommatus damon*. Then we climbed through a belt of conifers, where I was interested to find *Brenthis ino*, and came out on some steep uncut meadows, bright with familiar Alpine flowers. *Erebia ligea* in the trees gave way to *Erebia euryale* above, in fine condition and great abundance. Higher up were *E. tyndarus* and *E. ceto*, females of the latter still quite good. Right on the very top, over 5000 feet, were two *Chrysophanus alciphron* var. *gordius*, very worn—a strange encounter. From the top of the ridge westwards one sees a vast extent of country of rich entomological promise, but one can well imagine it very difficult to work. The uplands are waterless, with ill-defined tracks and places where one could stay few and far between.

Another day we worked up to the bottom of the cliffs of Mout Aiguille with much the same result, adding another *Erebia*, to wit *stygne*, male and female, both worn. *Thecla ilicis* was common here and there, and the females still in good condition. A single worn *Brenthis daphne* was netted and released, as also was a very worn male *Polyommatus amanda*. There were no Hesperiids except *Hesperia carthami*. *Agriades coridon* was just appearing. *Epinephele jurtina* was in swarms everywhere, with fine brightly marked females, approaching var. *hispulla*.

On Friday, July 26th, we moved on to Briançon, the next day I walked to La Grave. The day was very fine with cloudless skies and a cool breeze. From Briançon to Monêtier-les-Bains there was very little to be got, the fields bordering the road being too highly cultivated and the roadside barren and flowerless. This stage would be better done in one of the very convenient P.L.M. motors. Just before Monêtier I was surprised to find odd specimens of *Erebia ceto* and *E. euryale*. From Monêtier to Le Lautaret butterflies were very plentiful but few in species. The commonest was *Plebeius argus* and its variety *alpina*; then came *Hirsutina damon*, *Adopaea lineola*, *A. flava*, and *Parnassius apollo*. Near the summit were *Colias phicomone* and a single *Anthocharis simplonia*, in beautiful condition. After 3 p.m., when we were a mile or two from the top of the pass, butterflies disappeared and there was nothing to distract us from the wonder of the flowers. They remain the brightest memory of a glorious holiday.

At La Grave we stayed a week and had two bad days. Twice we worked up to and beyond the Glacier de la Meije, the second time to the top of the ridge above the little hut, whose lights we used to see every night from the hotel door. In the lower meadows there was not much to detain us, but when we got to the larches every clearing was alive with butterflies, *Erebia euryale* in swarms, *Argynnis niobe*, all typical, lots of little blues, and among them occasional *Polyommatus eros*. Above the trees the slopes, where the Alpine rhododendrons were in full flower, were full of *Brenthis pales*, nearly all typical with occasional var. *isis*. We were now over 7,000ft., and *E. euryale* made way for *E. tyndarus* and *E. lappona*, the former growing more numerous when we came to a little lake right under the cliffs below the summit. After lunch we climbed up to the ridge behind the hut across some steep patches of snow, but the sunshine was fitful and the wind cold, and we saw none of the higher Alpine butterflies except *Pieris callidice*, all tattered and torn, and *Erebia gorge*. The view from the ridge was wonderful; on one side the huge mass of La Meije, below us on the other an immense glacier seamed with hideous crevasses, away on the north-east the *massif* of Mont Blanc, very clear and distinct, and to the right of it a line of big snow peaks, suggesting the Valais Alps.

A long day on the bare heights at the back of the village, and another at Le Lautaret were spoiled by bad weather. August 1st I spent down the valley towards Bourg d'Oisans, and found swarms of *Hirsutina damon*, *Epinephele lycaon*, and *Erebia euryale*, with *Chrysophanus virgaureae* more numerous than elsewhere, yet never common.

On August 3rd we left La Grave and walked over the Col d'Arsine to Monêtier les Bains. We followed the Lautaret Road to Arsine, and then struck up a bare stony valley on the right, at the end of which we climbed up to the Refuge de l'Alp. On the slopes were numbers of *Polyommatus eros* of both sexes, and occasional *Brenthis pales* and *Colias phicomone*. These were the most conspicuous butterflies with *Erebia tyndarus* all the way to the Refuge and on to the Col. The slopes on the Monêtier side were much richer in species and numbers, and just before we got into the trees again there was a splendid corner where lowland and highland butterflies seemed to meet. *Anthocharis simplonia* occurred quite frequently on the way down, and two *Euchloë cardamines* at over 5,000ft. were somewhat of a surprise. Very occasionally *Latiorina orbitulus* gathered together in companies with *Polyommatus eros* at damp places on the path, but I never saw anything like the assemblies so common in the Swiss Alps. Odd specimens of *Erebia goante* were taken, but it seemed to be rare everywhere. Near Monêtier, *Plebeius argus* was abundant at rest on little shrubs by the torrent.

On August 4th we crossed the Col d'Eychauda to Vallouise and Briançon. A fine morning gave way by eleven to a dull, cool afternoon, and in consequence we got no chance of investigating the butterflies of the wild summit plateau and the superb valley on the southern side. In the pine woods above Monêtier *Erebia euryale* swarmed in thousands. Above the pines *E. lappona* occurred, but had to be walked up. The Col was the barest and bleakest we crossed, with long steep screes on either hand, where *Erebia glacialis* was disturbed, only to seek shelter from the searching wind among the stones out of our reach. I boxed one very fine ♀ almost unicolorous black, with a faint apical spot. The valley down below near Vallouise was very beautiful, and with sunshine would have given lots of butterflies. Anthrocerids were abundant, *A. carniolica*, *A. purpuralis*, *A. lonicerae*, and *A. filipendulae*. We walked on to Argentière and thence by train reached Briançon.

August 5th was a magnificent day. Leaving Briançon late, we walked across the Col d'Izouard to Château Queyras. For the first seven miles to Cervières we rose very slowly in a narrow valley with stony slopes on the left and a mountain stream on the right. Close to Briançon we took the first *Erebia neoridas*, newly emerged ♂s, *Hipparchia briseis* and *H. semele*, flying together over the same ground, and beautifully fresh *Satyrus actaea*. The last we never saw again. All along the road to Cervières there were a great many butterflies. Commonest were *Melitaea didyma*, *Hirsutina damon*, *Agriades coridon*, *Parnassius apollo*, and *Epinephele lycaon*. *Urbicola comma* was just emerging, *Agriades meleager*, fine ♂s, and *Polyommatus escheri* were picked up as we hurried along, and close to Cervières a single ♀ *Coenonympha dorus*. From Cervières we began to climb, and for the rest of the day, though the sky was cloudless, we saw hardly anything for our nets. At the top were a few *Erebia gorge* and *E. lappona*, but we were too late in the day, and Château Queyras, by the map, seemed to require a tramp of several hours. But a short cut left the newly engineered road a little way below the summit and two hours and a half of hard walking landed us at 7.30 at the Hôtel Puy Côt. I cannot too strongly urge the entomologist in Dauphiné not to miss this walk ; the fantastic limestone crags and pinnacles on the Queyras side are alone worth the journey from England.

From August 6th to 10th we were at Château Queyras. We did no climbing but spent our days in the valley and on the lower slopes of the hills near the village. *Erebia neoridas* occurred all round in small numbers, all males and newly emerged. *Klugia spini* was common, with large fresh ♀ s. *Coenonympha dorus* seemed to be rare, for the few I took of both sexes were quite good. There were no Vanessids and hardly any Pierids. Hesperiids were not common. I got *Hesperia alveus* and *H. fritillum*, *H. carthami* and *Powellia sao*. Of the blues *Hirsutina damon* and *Agriades coridon* were abundant, *Polyommatus escheri* was common with very fine ♀ s, *P. hylas* was just coming out, *P. icarus* and *Aricia medon* (*agestis*) were generally distributed. *Argynnis adippe* was common and fine, as also was *Issoria lathonia*. *Melitaea didyma*, *M. phoebe* and worn *M. athalia* were all of their genus. Towards Abriès *Satyrus cordula* was common and many in good order; *Epinephele lycaon* was abundant everywhere. On August 10th I took two *Nordmannia acaciae*, a little past their prime.

On August 11th we walked to Guillestre through the gorges of the Guil Valley. Two miles below Château Queyras *Erebia neoridas* was common and when the valley opened out a little the butterfly abounded on the lavender covered slopes. They constantly settled on the hot rocks, and less frequently at the flowers. Near Guillestre *Hipparchia briseis* turned up again and *Coenonympha dorus*. Between that place and the station *Epinephele tithonus* was common.

On our last day, August 12th, we spent a long morning at Clelles. Butterflies were abundant. *Satyrus circe* was worn and *S. alcyone* more so. *Epinephele jurtina* was in thousands. *Agriades coridon* was much commoner than a fortnight before, with plenty of ♀ s. *Melitaea cinxia* and *M. parthenie*, both second brood, were just coming out. On the rough ground between the station and the viaduct *Hipparchia briseis* was common, males and females, and in fine order. Down by the stream *Erebia aethiops* was just out, and *E. neoridas* on the edge of the thickets above.

So ended a month of sunshine snatched from perhaps the worst English year since 1877 or 1878. Altogether we took, or identified without taking, 108 species of butterflies.

Experiments on the capability of Ants to withstand drought and to recover from its effects when nearly dead.

By C. C. BEST GARDNER.

The following experiments were carried out in a room above the kitchen, which is furnished with a ventilator leading into the chimney, it is an exceedingly dry room. The windows and door were kept shut and the fire was not lit during the experiments. The ants were first placed in open upright test-tubes, which were too slippery for them to climb, and were subsequently removed and placed in a damp plaster nest, whilst there were still distinct signs of life. There were no other ants in the nest, so that when they recovered they did so unaided. Honey was placed in the nest. The ants used in the experiments were taken at random from healthy nests. Each ant was placed in a separate test-tube.

General notes.—I find that all the ants experimented on remained apparently unchanged until within about twelve hours or less of the

REFERENCE.		PLACED IN TUBE.		TEMPERATURE WHILE IN TUBE.	TIME IN TUBE.		PLACED IN DAMP NEST.		RESULT.
		DEC.	TIME.		HRS.	MINS.	DEC.	TIME.	
A	*Formica fusca*	9th	6.0 p.m.	53 to 56	111	0	14th	9.0 a.m.	failed to recover.
B	*Lasius flavus*	9th	6.30 p.m.	55 to 56	25	10	10th	7.40 p.m.	failed to recover.
C	*Myrmica laevinodis* ..	9th	6.40 p.m.	55 to 56	27	50	10th	10.30 p.m.	recovered after 3 days.
D	*Myrmica ruginodis* ..	9th	6.45 p.m.	55 to 56	37	45	11th	8.30 a.m.	doubtful.[*]
E	*Formica fusca*	14th	10.0 p.m.	50 to 58	64	20	17th	2.20 p.m.	failed to recover.
F	*Myrmica laevinodis* ..	14th	10.0 p.m.	55 to 58	35	15	16th	9.15 a.m.	recovered after 60 hrs.
G	*Myrmica ruginodis* ..	14th	10.0 p.m.	55 to 58	35	15	16th	9.15 a.m.	recovered after 84 hrs.
H	*Lasius flavus*	14th	10.0 p.m.	55 to 58	35	15	16th	9.15 a.m.	recovered after 150 hrs.
I	*Myrmica laevinodis* ..	16th	9.15 a.m.	50 to 54	29	5	17th	2.20 p.m.	recovered after 115 hrs.
J	*Myrmica ruginodis* ..	16th	9.15 a.m.	50 to 54	37	45	17th	11.0 p.m.	recovered after 16 hrs.
K	*Lasius flavus*	16th	9.15 a.m.	50 to 54	28	0	17th	1.15 p.m.	recovered after 5 hrs.
L	*Myrmica scabrinodis* ..	17th	2.50 p.m.	50 to 51	45	10	19th	mid-day.	recovered after 68 hrs.
M	*Myrmica scabrinodis* ..	17th	2.50 p.m.	50 to 51	52	25	19th	7.15 p.m.	recovered after 124 hrs.
N	*Myrmica scabrinodis* ..	17th	2.50 p.m.	50 to 51	31	55	18th	10.45 p.m.	recovered after 16 hrs.
O	*Formica fusca*	17th	11.0 p.m.	50 to 51	34	15	19th	9.15 a.m.	recovered after 30 hrs.

end, when they sank rapidly. Also when removed to the damp-nest they remained for a considerable time in the same state, but once recovery began it was rapid. In some cases they remained for over two days in this inert state before they showed signs of recovering, yet on the third day they were quite lively. I find that they are all more or less paralysed in the antennæ, this part being, as a rule, the last to recover; indeed, the whole of the front portion of the ant seems to break down, one ant (J) which had been in the damp nest for 16 hours could make little use of its front left leg, yet the rest of its anatomy seemed to be in order; again, another ant (E) which had been in the damp nest for over 24 hours seemed to have lost the use of the whole of the front portion of its body, its head was doubled up under it, and when it moved it did so by pushing with its hindlegs. I also noticed that when the end is drawing near, their hindlegs are stuck up straight in the air (I have sometimes noticed the same thing with ants killed in laurel) Somewhat similar experiments are referred to by Miss A. M. Field in an article in the *Biological Bulletin*, vol. 8, No. 6, 1904, pp. 300-309, and in the same publication No. 3, 1904, pp. 170-174.

Notes on individual Ants.—**A.**—This ant certainly ought to have been removed at least 15 hours before it was, when I think it might have recovered, I was away at the time and believe the ant was dead some considerable time before its removal.

D.—This Ant is of particular interest, it partially recovered after being three days in the damp nest, the nest was then again damped, by being placed in a plate containing water, when the ant started to behave as though in pain, wildly waving its legs and rolling about (**C.** which was in the nest at the same time, remained motionless). It was then noticed that both antennæ were sharply bent at the elbow, thus **L**, and that it had apparently lost the use of them, also nearly the whole of the top of the abdomen was caved in. I then clipped its spines (in doing which I fear I must have injured it) and placed it back in its own nest, two days after I was unable to ascertain whether it was alive or not, but for the last two days an ant had apparently got hold of it where its spines were, but did not attempt to carry it about. On the morning of the 17th I found it stretched out on its back, dead, with no ant attending it. On the 16th the abdomen was tucked up under it, so I conclude it must have then been alive. The right antenna had straightened out, but the left remained as before, and the dent in the abdomen was the same.

K.—I think the very quick recovery of this ant (for after being in the damp nest for five hours it was quite lively) shows that it could have remained some time longer in the tube and still have recovered.

G.—This ant suddenly recovered from being nearly dead to a very lively state. The difference in the time that this ant and its nest mate (**J**) took to recover should be noted.

E.—This ant died on the morning of the 23rd.

F.—When this ant was removed from the tube it showed no visible signs of life.

SOCIETIES.

Entomological Society of London.—*October 16th*, 1912.—The following were elected Fellows of the Society:—Mrs. E. M. Waterfield, The Hospital, Port Sudan; Messrs. P. A. Buxton, M.B.O.U., Fairhill, Tonbridge, and Trinity College, Cambridge; A. Noakes, The Hill, Witley, Surrey; Norman D. Riley, 94, Drakefield Road, Upper Tooting, S.W., and British Museum (Natural History), S. Kensington, S.W.; and H. S. Wallace, 17, Kingsley Place, Heaton-on-Tyne. Arctic Dragonflies.—Mr. W. J. Lucas exhibited a specimen of *Somatochlora alpestris* from Porsanger Fjord, east of North Cape, also a specimen of *Aeschna caerulea* (=*borealis*), from the same locality, both taken by Mr. W. G. Sheldon, in 1912. Eurytela hiarbas, Drury, and E. dryope, Cramer.—Professor Poulton drew attention to a letter he had received nearly two years ago from Mr. G. F. Leigh, describing the breeding of *E. dryope* and drawing the inference that the species was distinct from *hiarbas*. Müllerian mimicry between Australian Bees.—Professor Poulton exhibited on behalf of Dr. R. C. L. Perkins a male of *Prosopis nubilosa*, Cock., (*Prosopidae*), and of a species of *Halictus* (*Andrenidae*), captured by him in the Cairns district of North Queensland (July 1904), the hard glistering yellow mark on the black scutellum and post-scutellum of the *Prosopis*, and that on its lateral prothoracic tubercles being mimicked by a yellow pubescence occupying the same positions in the *Halictus*. A new species of Argynnis.—The Rev. G. Wheeler exhibited two specimens of a new *Argynnis*, discovered in June last by Mr. Harold Powell, F.E.S., at Lambessa in Algeria. Mons. Oberthür named it *auresiana*. Cocoons of Norasuma kolga, H. Druce, spun under natural conditions.—Dr. W. A. Lamborn observed that some cocoons formed by larvæ of this species in captivity had been previously exhibited by Professor Poulton. The specimens now exhibited were formed by wild larvæ under leaves, and were found in the clearing at Oni Camp. They gave a better idea as to the mimicry of Braconid cocoons by the formation of little bosses of yellow silk. Ants, and a new myrmecophilous species.—Mr. Donisthorpe exhibited (1) a small incipient colony of *Camponotus ligniperdus* taken at Yvorne, Switzerland; (2) Specimens of a Proctotrupid new to science, *Loxotropa donisthorpei*, Kieffer, taken in a nest of *Lasius flavus* at Blackgang Chine, Isle of Wight; (3) A specimen of *Camponotus abdominalis* var. *atriceps*, Smdt., an American species, captured alive in his room on his return from Weybridge. Hybrids and second broods.—Mr. L. W. Newman exhibited (1) a long and varied series of the hybrid *Smerinthus ocellatus* ♂ × *Amorpha populi* ♀, bred September, 1912, out-of-doors, from a pairing obtained June, 1912, the larvæ pupating in July and early August. (2) Living specimens of the hybrid *Zonosoma pendularia* ♂ × *annulata* (*omicronaria*) ♀. (3) A living ♀ specimen of *Metrocampa margaritaria*, taken at rest in Bexley Woods, October 14th, 1912, which points to a second emergence of this species. (4) A ♀ specimen of *S. ocellatus* bred out-of-doors, on September 14th, from larva which pupated in June, 1912. Nonagria dissoluta.—Mr. H. M. Edelsten exhibited specimens of *Nonagria dissoluta* and var. *arundineta* from East Kent, bred during August, 1912, 75 per cent. from this locality being *dissoluta*. The following papers were read:—"Notes sur quelques espèces des *Lucanides* dans les collections du British Museum et de l'Université de Oxford," par M. Henri Boileau, F.E.S. "Synaposematic resemblance between Acraeine larvæ," by G. D. H. Carpenter, B.A., M.B., F.E.S.

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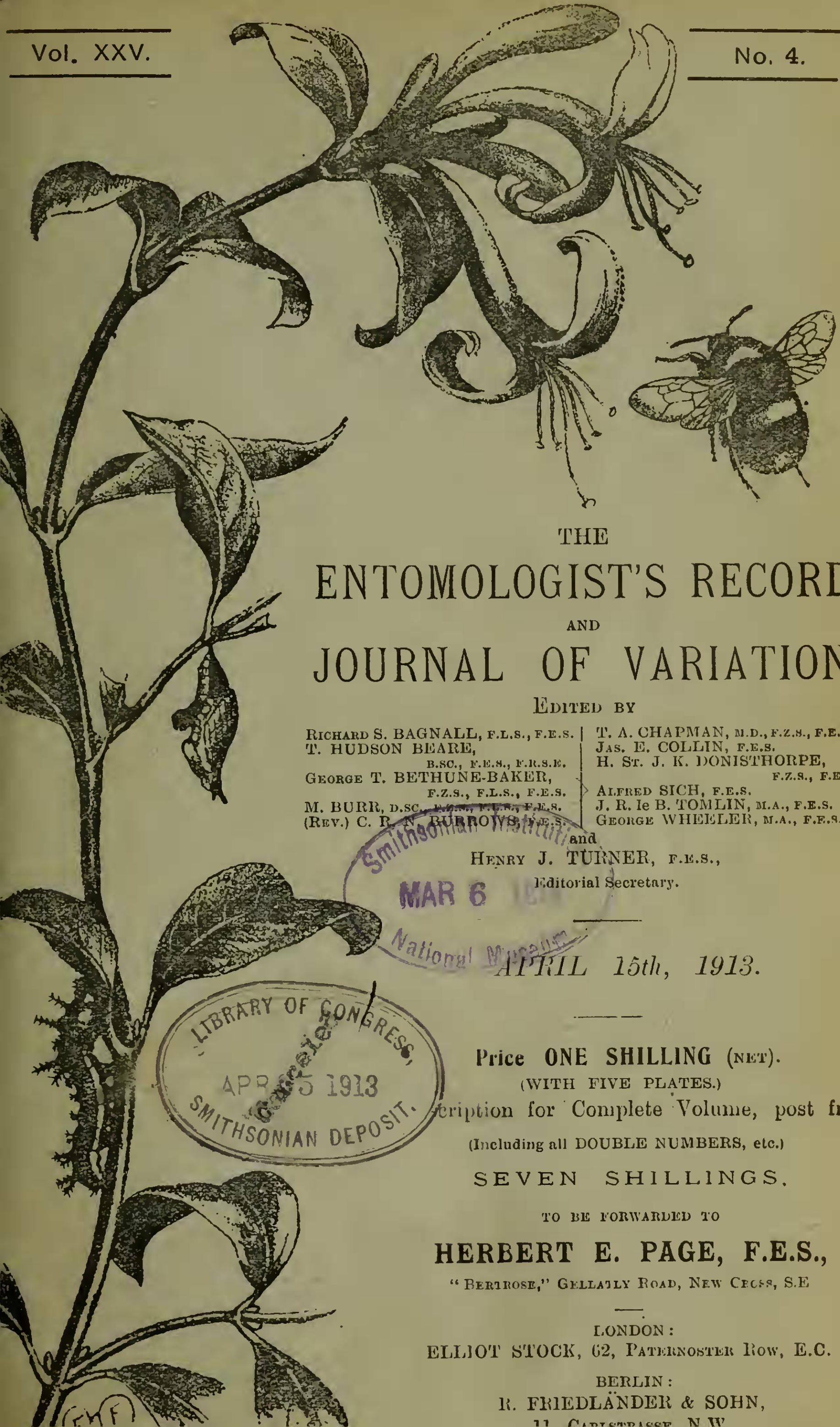

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Lepidoptera in the Wye Valley during 1912.

By J. F. BIRD.

Last year may well be compared to the curate's famous egg. Even if it was disappointing at times it was undoubtedly "good in parts!" As will be seen further on, from the dates of the first appearance of each insect met with during the first half of the year, the season in the Wye Valley commenced early. Larvæ were most abundant in May and June, and most of the oaks in this district suffered more or less considerably from their ravages; some trees, indeed, being very nearly denuded of all their foliage. Unfortunately, the lovely weather we all enjoyed in the spring did not continue, and the promise of another fine summer was not fulfilled; otherwise, judging from the abundance of insects up to the end of June, I am sure last year, following as it did the wonderful season of 1911, would have proved, entomologically, a veritable *annus mirabilis*. Notwithstanding the low mean temperature during the wet and sunless summer, a few species, as a rule single-brooded, produced individuals of a second emergence during the season. Several common insects, however, were conspicuous by their absence or else extremely scarce, yet I was able to add the names of 15 species of Macro-lepidoptera to our local list, not previously observed by us in this district, *viz.*, *Aricia medon*, *Melitaea aurinia*, *Smerinthus ocellatus* (obtained by a friend at Llandogo), *Hemaris tityus*, *Drepana cultraria*, *Drymonia chaonia*, *Asphalia ridens*, *Agrotis cinerea*, *A. corticea*, *Cucullia verbasci*, *Plusia moneta*, *Bupalus piniaria*, *Apocheima hispidaria*, *Anticlea rubidata* and *Eupithecia dodoneata*.

In the following list of the Macro-lepidoptera met with during the year I have, with a few exceptions, included only "wild" records; bred records being mentioned when specimens were not otherwise observed in the imaginal state. The list is arranged in chronological sequence and shows, I think, how the forward season was gradually checked by the cold and wet summer until it became normal, or even a little late. As most of my notes refer to the parish of St. Briavels, Gloucestershire, I need only state localities when the earliest record occurred elsewhere in the district. I must also mention that both my father and I kept separate records of the earliest appearance of the "macros" during the season, and to make these notes as complete as possible, I have included all the species observed by him alone and also used his dates of occurrence whenever they were earlier than mine. During October and November I was away in Cornwall, so all the notes during those months, as well as most of the Monmouthshire records, are his:—

February 8th.—*Orrhodia vaccinii* (Tintern, Mon.).—Hybernated specimens seen up to March 9th.

February 10th.—*Hybernia leucophaearia*.—Commoner than usual. Besides obtaining ab. *marmorinaria*, I took a handsome cream-coloured specimen with the central band boldly outlined in jet-black. *Phigalia pedaria* (Llandogo, Mon.).

February 12th.—*Hybernia progemmaria* (Tintern).

February 18th.—*Gonepteryx rhamni*.—Hybernated specimens were seen on the wing well into July when the larvæ on the buckthorn were quite an inch long. *Vanessa io*.—July 8th was the latest date on which I saw a hybernated specimen. *Anisopteryx aescularia* (Tintern).

February 29th.—*Apocheima hispidaria.*—Two ♂'s bred from larvæ found on one of my oak-trees. I carefully searched the trunks for more, but without success.

March 2nd.—*Tephrosia bistortata* (Tintern).—I netted a melanic ♂ in my garden on May 26th.

March 3rd.—*Taeniocampa cruda* (Tintern).

March 5th.—*Anticlea badiata* (Tintern), and *Taeniocampa gothica* (Tintern).

March 7th.—*T. stabilis* (Tintern).

March 10th.—*Pachnobia rubricosa.*—One or two at light.

March 11th.—*Xylocampa areola.*—This species had quite a long season, the last being seen on May 8th.

March 14th.—*Asphalia flavicornis* (bred). *Taeniocampa opima* (Tintern).—A few at light on both sides of the river, the last on April 16th.

March 20th.—*T. populeti* (bred).—The larvæ occur in hundreds every year on three particular aspens growing near one another. I went to take some during the second week of May, but owing to the forward season found all the larval shelters empty. In 1911, they were not full-fed until the first week in June.

March 23rd.—*Eupithecia abbreviata.*—A fine melanic specimen came to light on April 13th.

March 24th.—*Sarrothripa undulanus* (Tintern).—Another was observed on May 13th.

March 26th.—*Aglais urticae.*

March 30th.—*Polygonia c-album.*

April 1st.—*Tephrosia punctularia* (Llandogo). *Lobophora carpinata* (Llandogo).—Several turned up at light during this month, and later in the season I obtained larvæ on sallow.

April 3rd.—*Tæniocampa munda. Brephos parthenias.*—I put off trying for this insect until too late, and found it on this date going over. *Selenia illunaria.*—We omitted to note in the summer the first appearance of var. *juliaria. Larentia multistrigaria.*—One at light.

April 7th.—*Celastrina argiolus.*—The remarkable abundance of the first brood was quite a feature of the spring, and specimens were recorded up to June 9th. *Pararge aegeria* (first brood).

April 15th.—*Taeniocampa incerta* (very worn).—Larvæ were obtained on birch, privet and currant, and from one of the resulting pupæ (which, by the way, were in no way forced), a moth emerged on December 9th. *Asphalia ridens.*—A ♂ at light. From May 13th to the beginning of June I obtained several larvæ on oak. *Anticlea derivata* (Tintern).—The latest record for this species was May 22nd. *Anthocharis cardamines.*—On May 26th, I noticed a ♀ ovipositing on *Capsella bursa-pastoris.* The ova were deposited singly on the side of the clump of flower-buds at the upper end of the stem. I afterwards examined the neighbouring *Capsella* plants and found several more eggs all laid in a similar position and never more than one on each shoot.

April 20th.—*Ematurga atomaria.*—I bred a ♀ on May 9th, from a larva off heather.

April 21st.—*Pieris napi*, *Lophopteryx camelina* (at light), *Bapta temerata* and *Melanippe fluctuata.*

April 22nd.—*Pieris brassicae.*—This first specimen, a small ♂, is remarkably like *P. rapae* both in the shape and the small expanse of its wings. *Triphosa dubitata* (hybernated).

April 23rd.—*Panagra petraria* and *Eupithecia pumilata.*

April 25th.—*Rumia luteolata* and *Cidaria suffumata.*

April 27th.—*Coremia designata* (Tintern).—Seen throughout the summer until September 13th.

April 28th.—*C. unidentaria.*—On the wing during the five following months.

April 29th.—*Hipocrita jacobaeae.*—The latest record was July 15th. *Drepana cultraria* and *Cidaria corylata.*

May 5th.—*Drepana falcataria*, *Emmelesia affinitata.* *Eupithecia dodoneata.*—One at rest on a tree-trunk and another netted at dusk on May 8th.

May 6th.—*Hesperia malvae*, *Phytometra viridaria*, *Venilia maculata*, *Coremia ferrugata*, *Asthena candidata*, *Emmelesia albulata* and *Lobophora hexapterata* (common on aspen trunks).

May 7th.—*Anaitis plagiata* (first brood).

May 8th.—*Spilosoma menthastri*, *S. mendica* (Tintern), *Cabera exanthemaria*, *Hemerophila abruptaria* (one very worn specimen) and *Eupithecia vulgata.*

May 9th.—*Brenthis euphrosyne.*—On this date I netted a ♂ with the three inner spots in the discal cell coalescing and forming one large blotch; also the median band of spots on the wings are much enlarged. *Pararge megaera*, *Nisoniades tages*, *Demas coryli* (a ♂ at light), *Cilix glaucata*, *Heliaca tenebrata*, *Cabera pusaria* and *Numeria pulveraria.* *Ligdia adustata.*—Met with sparingly throughout May, June and July. *Acidalia remutaria*, *Melanippe montanata* and *Eubolia plumbaria.*

May 10th.—*Rumicia phlaeas* (Tintern), *Pyrameis atalanta* (Tintern), *Grammesia trilinea* (ab. *bilinea* on May 22nd), *Habrostola urticae* (Tintern), *Cidaria silaceata* (Tintern) and *Thera obeliscata.*

May 11th.—*Amorpha populi.*—A ♀ was found at rest on July 10th. *Leiocampa phoebe* (*dictaea*) (bred) and *Asthena blomeri.*

May 12th.—*Phlogophora meticulosa.* *Agrotis cinerea.*—Two ♂s at light, the second on May 20th.

May 13th.—*Polyommatus icarus*, *Coenonympha pamphilus*, *Dasychira pudibunda*, *Euclidia glyphica*, *E. mi*, *Gonodontis bidentata* (Tintern) and *Minoa murinata.*

May 14th.—*Dicranura vinula* (Tintern).—During the summer the larvæ were exceptionally abundant on poplar. *Hepialus lupulinus*, *Aplecta nebulosa* (bred, Tintern) and *Hadena genistae.*

May 16th.—*Jochaera alni* (bred).

May 18th.—*Xylophasia rurea* (Tintern).—Scarce: only a few examples, referable to ab. *combusta*, noticed. *Epione advenaria* and *Eupithecia centaureata* (one only, taken at light).

May 19th.—*Hadena dentina.*

May 20th.—*Noctua rubi* (Tintern) and *Nola confusalis.*

May 22nd.—*Spilosoma lubricipeda.* *Agrotis exclamationis.*—I bred a ♂ from a larva found in the garden under some weeds in July, 1911. It stopped feeding in August, became "grub-like," and remained like this until May 7th when it pupated; the moth emerged on June 24th. *Apamea basilinea* (one found dead, Tintern). *Hadena thalassina.*—I bred several, the first emerging on May 10th, from a batch of ova laid on a leaf on a small aspen-bush. They fed up on geranium. *Melanippe hastata* and *Lobophora viretata* (two specimens on tree-trunks).

May 23rd.—*Cidaria truncata* and *Eupithecia castigata.*

May 24th.—*Hepialus humuli* and *Hypena rostralis* (Tintern).

May 25th.—*Parasemia plantaginis.*

May 26th.—*Plusia gamma* (worn).

May 27th.—*Augiades sylvanus*, *Phragmatobia fuliginosa*, *Agrotis puta* (a rather worn ♀), *Cucullia umbratica* and *Acidalia aversata.*

May 28th.—*Iodis lactearia* and *Mesoleuca ocellata.*

May 29th.—*Eupithecia pulchellata.* On this date my father and I visited a certain spot in the Wye Valley district on the Gloucestershire side of the river. As a small colony of *Melitaea aurinia* exists there, we have been requested by the entomologist who made us acquainted with it not to be too explicit when mentioning the locality. Here we recorded the first appearance of the following lepidoptera: *Brenthis selene*, *Melitaea aurinia* (we contented ourselves by taking five good specimens), *Aricia medon* (not uncommon about the *Helianthemum*), *Hemaris tityus* (a few seen and a pair netted) and *Miana strigilis.*

May 30th.—*Camptogramma bilineata.*—Latest record on September 20th.

During May *Eucosmia certata* was attracted by light at Tintern, but the exact date was not recorded.

June 1st.—*Eupithecia satyrata.*

June 2nd.—*Noctua triangulum* (bred, Tintern) and *N. primulae* (*festiva*).

June 3rd.—*Pygaera bucephala* (bred, Tintern) and *Plusia pulchrina.*

June 4th.—*Leucania comma* and *Acidalia subsericeata.*

June 5th.—*Mamestra brassicae*, *Dianthoecia cucubali*, *D. capsincola* and *Plusia chrysitis.*

June 6th.—*Eupithecia rectangulata.*

June 7th.—*Triaena psi* (Tintern).

June 9th.—*Ægeria tipuliformis* and *Habrostola triplasia.*

June 10th.—*Boarmia repandata.*

June 11th.—*Pyrameis cardui* and *Metrocampa margaritata.*

June 13th.—*Zanclognatha grisealis.* *Bupalus piniaria.*—A ♂, the only specimen we have met with in this district. It surprised me to net this day-flier on the wing at dusk.

June 18th.—*Pterostoma palpina* (two netted at dusk, the second on June 29th), *Miana fasciuncula* and *Hydriomena impluviata.*

June 20th.—*Triphaena pronuba.*

June 21st.—*Epinephele jurtina* (latest record was September 15th) and *Mesoleuca bicolorata.*

June 22nd.—*Sesia stellatarum.*—Only a few seen, the latest on July 14th.

June 23rd.—*Hylophila quercana.*—Two fine specimens bred, the second on the 24th, from larvæ found on May 13th feeding on oak. *Cidaria fulvata.*

June 24th.—*Hypena proboscidalis*, *Angerona prunaria*, *Boarmia gemmaria* (*rhomboidaria*), *Eupithecia assimilata* and *Anticlea rubidata.*

June 26th.—*Anthrocera filipendulae.*—This species and *A. trifolii*, usually so common, were very scarce; no doubt owing to the drought during the preceding summer. Where I formerly met with them the herbage was, in 1911, cropped close to the ground by cattle and horses, and I expect the larvæ suffered in consequence. *Euplexia lucipara*. *Agrotis corticea.*—Two at Portugal laurel. The blossoms of this evergreen were most attractive during the latter end of June and many common species swarmed round the flowers at dusk, amongst others: *Hadena thalassina*, *Triphaena pronuba*, *Euplexia lucipara*, *Xylophasia lithoxylea*, *Noctua primulae* (*festiva*), *Ourapteryx sambucaria*, *Boarmia repandata* ab. *conversaria*, *Asthena luteata* and *Hydriomena impluviata*. *Zonosoma linearia*. —A few beaten from beech.

June 28th.—*Xylophasia lithoxylea*. *Ourapteryx sambucaria.*—I observed a ♀ at dusk hanging from under a sage leaf in the garden, and next morning found it had laid five eggs. On July 8th, I netted an example of ab. *cuspidaria*, ♂. *Asthena luteata*.

June 30th.—*Hydriomena furcata.*—I bred a melanic example from a larva off sallow on June 26th. This form is common in the district.

(*To be concluded.*)

Myrmecophilous Notes for 1912.

By H. St. J. K. DONISTHORPE, F.Z.S., F.E.S.

(*Concluded from page 68.*)

COLEOPTERA.

Oxypoda vittata, Märk.—A specimen was captured on the wing at Woking on April 21st.

Oxypoda haemorrhoa, Sahl., *Thiasophila angulata*, Er., *Notothecta flavipes*, Gr., and *Homalota parallela*, Man.—Mr. Butler tells me he took these four species in nests of *Formica rufa* at Llanberis last year. They are all new records for Wales.

Thiasophila inquilina, Märk., occurred in great abundance in a nest of *Lasius fuliginosus* at Wellington College, on April 17th, when some 50 specimens were secured. This, however, was a very small proportion of the beetles present. I have never seen it in anything like such numbers in a nest before. *Notothecta confusa*, Märk., was also plentiful in this nest.

Dinarda märkeli, Kies.—A specimen was observed on July 23rd in the New Forest, crawling up towards a nest of *Formica rufa*, which was situated on a bank.

Dinarda dentata, Gr.—A specimen from Woking was introduced into my *F. sanguinea* observation nest on April 22nd. A *sanguinea* ☿ at once seized it by the antenna, but quickly let go when the beetle poked its tail into the ant's face. The usual defence, which I have always found to be successful. A second specimen was introduced on May 13th. They lived in the nest till September 1st, when they were accidentally killed by me. On my return from Belgium, I found the nest itself (though the ants were in good condition) was very foul, and decided to move the colony into a clean plaster nest. The old nest was connected with the new by means of an indiarubber tube, but the ants refused to move. Tobacco smoke proving ineffectual, the fumes of ammonia were used, when the ants moved into their new quarters, but the ammonia proved too much for the beetles, which died.

Dinarda hagensi, Wasm.—A number of specimens was observed in the nests of *F. exsecta* at Parkhurst Forest, I. of W., on September 8th. The beetle was more numerous than I have seen it there before.

Drusilla canaliculata, F.—On May 30th a specimen was found in a nest of *F. fusca*, on the I. of Tiree.

Staphylinus stercorarius, Ol.—Mons. Bondroit gave me a specimen of this beetle, which had been taken by a friend of his in a nest of *Tetramorium caespitum* at Dover, in August, 1910. This capture is of considerable interest, since Wasmann[1] has recorded that it is common in nests of *Tetramorium* in the North of Luxemburg, and he considers it has there become a *Tretamorium* robber. I[2] had already expressed my opinion that this beetle exhibits a distinct tendency to inhabit ants' nests. The following other records with ants in this country are now known to me.

With *Myrmica laevinodis*, South Shields, August and September, 1860 (Bold).[3] A fine series at South Shields in the nests of a *Myrmica* (Bold)[4]. "In a nest of red ants I found the golden tufted *Staphylinus stercorarius* at Allerston" (Hey).[5] With *Lasius flavus* (Donisthorpe).[6 & 7] With *Myrmica ruginodis* at Rannoch on several occasions (Walker).[8] In a nest of *Formica rufa* near West Ayton, Yorks, August, 1903 (Hey)[9]. With *L. flavus* at Blackgang and Sandown, Isle of Wight (Donisthorpe).[10] In a nest of *Myrmica scabrinodis*, at the Forth Bridge, in July (Donisthorpe).[11] I shall be glad if anyone will send me further records of the occurrence of this species with ants.

Neuraphes carinatus, Muls.—A specimen of this very rare beetle was dug up, deep in a nest of *F. fusca*, at Box Hill, on May 30th. Fowler[12] gives Shirley (Rye), and a specimen in Dr. Sharp's collection. I only know of two other captures, one by Britten in Cumberland, and the other by Dollman at Ditchling. I[13] have before recorded *N. angulatus*, Müll., with ants, and Wasmann[14] records other species, but thinks they are chance guests. It seems, however, advisable to record this rare species in ants' nests, as it may have a strong tendency towards the Myrmecophilous habit, especially as Mulsant[15] originally recorded it as occurring in company with *Lasius brunneus* at Avenas in the Beaujolais Mountains.

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[1] "*Staphylinus Arten als Ameisenräuber*," *Zeits. f. wissens. Insektenbiol.*, xvi., 1910, p. 6.

[2] *Trans. Ent. Soc. Lond.*, 1909, Pt. III., p. 407.

[3] *Zool.*, 1861, p. 7409.

[4] *Col. North. and Durh.*, 1871, p. 37.

[5] *Nat.*, 1895, p. 270.

[6] *Ent. Mo. Mag.*, 1895, p. 99.

[7] *loc. cit.*, 1896, p. 48.

[8] *Ent. Mo. Mag.*, 1900, p. 25.

[9] *Nat.*, 1904, p. 232.

[10] *Proc. Lancs. and Ches. Ent. Soc.*, 1905, p. 41.

[11] *Ent. Rec.*, 1907, p. 255.

[12] *Col. Brit. Isles*, II., 1889, p. 75.

[13] *Ent. Rec.*, 1905, p. 271.

[14] *Krit. ver d. Myr. u. Ter. Art.*, 1894, p. 123.

Batrisodes venustus, Reich.—My friend Dr. Nicholson having kindly told me he had taken this beetle in an ants' nest in a tree stump in Epping Forest, and having given me a plan of the spot, I decided to go and investigate the matter. Accordingly, on April 4th, I went, and found the tree stump was inhabited by a strong colony of *F. fusca*. Six specimens of the beetle, as well as what I consider to be its larva, were found in the galleries of the ants, in the heart of the nest, no specimens occurring away from the ants. I consider this species to be a regular Myrmecophile. Kraatz[16] records it with *F. rufa*, *F. fusca*, and *L. fuliginosus*, and Von Hagens[17] with *L. brunneus*, and Ganglbauer, Reitter, Roger, etc., all record it with ants on the Continent. Wasmann[18] says it feeds on mites in ants' nests, and is an indifferently treated lodger.

I know of the following records with ants in Britain:—In a nest of *M. scabrinodis*, in Yorkshire (Smith[19]), sub *B. formicarius*. I[20] have dealt with this record in my paper on the Genus *Myrmica*. With *L. fuliginosus* at Cambridge (Crotch[21]), and in Sherwood Forest and at Ulting near Maldon (Fowler[22]). In ants' nests (Ellis[23]). With *L. fuliginosus*, Tilgate Forest (Donisthorpe[24]), and at Cothill near Oxford (Collins[25]).

Amphotis marginata, F.—Several specimens having been found in a nest of *L. fuliginosus* (the normal host) at Wellington College on September 28th, one of them was introduced into my observation nest of *L. umbratus* var. *mixto-umbratus*. It ran about in the nest, and ducked down when it met an ant, its shape entirely protecting it. It soon gained the inner chambers, in one of the two of which it generally remains. It has lived with these strange ants for nearly five months, being alive and well to-day. There is evidently something attractive about the beetle, as the ants are continually observed to lick it and gently scrape at it with their jaws. This is not unpleasing to the beetle, as it then sits with the head and thorax partly raised, and the antennæ exposed, whereas when attacked or frightened it crouches flat, with the antennæ and legs drawn in under the wide margins of the thorax and elytra. On October 27th I saw it fed by its hosts. Fresh honey had been given to them in the last (the driest, light) chamber, nearly all the ants had streamed out to it, and a few kept returning to their larvæ in the first (dampest, dark) chamber. The beetle was evidently much excited, it stood raised high up on its front legs, the antennæ rapidly vibrating. It made little rushes and butted at the returning ants, tapping them with its antennæ. Soon one was observed to stop in front of the beetle, and open its jaws, when the beetle put its mouth close to the ant's and was seen (through a lens) to be fed. All the time it kept tapping very rapidly with its antennæ. The process was repeated with others of the returning ☿ ☿. Since then I have frequently seen the beetle fed. Although *umbratus* is so unlike *fuliginosus* in appearance (*umbratus* and its races being of course bright yellow, and *fuliginosus* jet black), still it has a similar smell, though not nearly so pronounced, as pointed out by Dr. Brun.[26] Moreover, I believe it also produces carton occasionally, which is always the case with *fuliginosus*. In a former paper, when recording the capture of *Myrmedonia humeralis* (a beetle whose normal hosts are *L. fuliginosus* and *F. rufa*) with *L. umbratus*, I[27] stated, "I am inclined to think the stump had originally been inhabited by the former ant (*L. fuliginosus*), as some of the inner wood showed traces of the black colour caused by this ant in trees infested with it." I now believe that this was caused by the *umbratus* themselves, since, this year (1912), I have found several nests in the ground under heather at Weybridge, with what were evidently black carton cells for the larvæ, deep in the nest at the roots of the heather. The carton cells constructed by *fuliginosus*, have nothing to do with the trees, or stumps, they may be in, since similar carton may be found in nests in the earth, or even in sand, as I once found with a colony on the sand-hills at Southport[28].

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[15] *Opusc. Entom.*, 1861, pp. 67-69.

[16] *Stett. Ent. Ztg.*, 1849, p. 187.

[17] *Berlin Entom. Zeitschr.*, ix., 1865, p. 111.

[18] *loc. cit.*, p. 92.

[19] *Trans. Ent. Soc. Lond.*, 1855, p. 116.

[20] *Ent. Rec.*, 1913, p. 45.

[21] *Zool.*, 1862, p. 8140.

[22] *Col. Brit. Isles.*, III., 1889, p. 93.

[23] *Vic. Hist. Worcester*, 1901, p. 98.

[24] *Trans. Lancs. and Ches. Ent. Soc.*, 1905, p. 42.

[25] *Col. Oxford*, *2nd Sup.*, 1910, p. 5.

Crawley and I[29] have proved that ♀ ♀ of *fuliginosus* will be accepted by ☿ ☿ of *umbratus*, and the similar smell of the two species may help towards this end.

Potosia (*Cetonia*) *cuprea* var. *floricola*, auct. = var. *metallica*, Hbst. This according to Herr Reitter, who has kindly sent me specimens of the typical *cuprea*, and the var. *obscura*, from the continent (when I sent him specimens of our Scotch form), is the synonymy of our ant's nest species. Several specimens hatched in my observation nest of *F. rufa*, in September, which were introduced as larvæ on June 28th, 1911. Larvæ were again found in abundance in a nest of *F. rufa*, at Nethy Bridge, in May.

Clythra 4-punctata, L.—Specimens hatched out of my *rufa* nest in May. On April 1st I introduced larvæ into a plaster nest containing a small colony of *rufa*. The larvæ came from a *rufa* nest on Weybridge Heath and the *rufa* colony from St. George's Hill, Weybridge. These larvæ lived in a plaster nest, where there was no refuse, as easily as in my observation nest, which contains sand and all the pine needles and usual débris of the nest. I gave some to Mr. Main to photograph, but some are alive to-day (February 9th), over ten months since they were introduced. I have written in my note-book, on June 23rd, "*Clythra* larvæ moving about and apparently eating at the ground." It is evident that these larvæ devour (as with *Microdon*[30]) the pellets and droppings of the ants, otherwise they could not live so long a time in a nest without any other food.

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[26] *Biol. Centralb.*, xxxiii., 1913, p. 27.

[27] *Ent. Rec.*, 1911, p. 59.

[28] *Ent. Rec.*, 1905, p. 271.

[29] *Trans. Ent. Soc. Lond.*, 1911, pp. 664-672.

DIPTERA.

Ceratopogon myrmecophilus, Egger.—Several ♂ ♂ were observed on October 2nd hovering over my observation nest of *F. rufa*. Other ♂ ♂ were seen, as usual, at Weybridge, on July 10th, hovering over *rufa* nests. The ♀ appears to be rare, I have never taken it in nature, once I bred it out of my *F. rufa* from Oxshott in 1898,[31] and again in a *rufa* nest from Weybridge in 1906,[32] and finally I found one in a nest of *F. exsecta* from Parkhurst Forest in 1910.[33]

Phyllomyza sp. ?—Taken in a nest of *L. fuliginosus*, at Oxshott, on July 9th. I gathered from Mr. Collin, who said this was not *P. lasiae*, Collin, that this is not the other species recorded by me as *Phyllomyza* sp. ? taken with the same ant at Birkdale[34] and Darenth Wood.[35]

P. formicae, Collin.—Specimens were taken in nests of *F. rufa* at Nethy Bridge, on May 17th.

Phora aequalis, Wood.—Specimens were found in a nest of *L. fuliginosus* at Wellington College, on April 17th. I am quite convinced that the species of *Phora* I take with ants are regular Myrmecophiles, in spite of the fact that they may be taken away from ants' nests, and even in numbers. I took this species with the same ant at Darenth Wood[36] in 1909, and again[37] in 1910. Mr. Wood[38] says that this species is widely distributed and very common.

Phora femorata, Mg.—One specimen was captured at Nethy Bridge, on May 19th, which ran out of a nest of *M. ruginodis*, situated under a stone.

ICHNEUMONIDÆ.

Ceuteterus oprimator, Grav.

A specimen was found in a nest of *M. ruginodis* under a stone at Nethy Bridge, on May 19th.

BRACONIDÆ.

Euphorus bistigmaticus, Morley.—Specimens were observed hovering over *rufa* nests at Weybridge, on July 18th.

Pachylomma buccata, Bréb.—Specimens were captured hovering over ants in a nest of *F. fusca* subsp. *rufibarbis*, at Weybridge, on

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[30] *Ent. Rec.*, 1912, p. 36.
[31] *Ent. Rec.*, 1902, p. 17.
[32] *Ent. Rec.*, 1907, p. 4.
[33] *Ent. Rec.*, 1911, p. 60.
[34] *Ent. Rec.*, 1907, p. 4.
[35] *Ent. Rec.*, 1909, p. 289.
[36] *Ent. Rec.*, 1909, p. 289.
[37] *Ent. Rec.*, 1911, p. 61.
[38] *Ent. Mo. Mag.*, 1909, p. 61.

July 10th. On July 18th a single specimen was dug up in a nest of *L. niger* subsp. *alienus*, in the same locality. It is evidently parasitic on many species of ants. Cobelli[39] records another species, *P. cremeri*, de Rom., with *L. fuliginosus*, as was also recorded by Giraud.[40] It has not been found in Britain, but may occur.

PROCTOTRUPIDÆ.

Loxotropa donisthorpei, Kieffer.—This small new species, which possesses very short wings, was found in some numbers in a nest of *L. flavus* at Blankgang Chine, on September 9th. They appeared to be quite at home among the ants.

Baeus seminulum, Haliday.—♂ ♂ and ♀ ♀ of this little species were bred on May 27th and June 7th and 8th in a bowl which contained a small colony of *F. rufa* and débris from their nest brought from Nethy Bridge in May. Only the ♀, which is apterous, was known to Haliday, and I can find no British records of the ♂, which is winged.

Ceraphron myrmecophilus, Kieffer.—♂ ♂ and ♀ ♀ of this new species were bred in the bowl described above on June 12th, 14th and 23rd. In this species also the ♂ is winged and the ♀ apterous.

Professor Kieffer, who has kindly named these species for me, has also sent me the names of some captures in 1911.

Exalonyx wasmanni var. *sociabilis*, Kieffer.—Two specimens taken in a nest of *L. fuliginosus* at Darenth Wood, May 26th, 1911. The type was taken by me[41] with the same ant at Wellington College in September, 1907.

Amblyaspis sp.? ("nom plus tard" K.).—With *L. fuliginosus*, Darenth Wood, May 26th, 1911.

CYNIPIDÆ.

Kleditoma formicaria, Kieffer.—♂ ♂ and ♀ ♀ of this new species were bred in the *rufa* bowl mentioned above on June 19th, 21st and 26th.

HETEROPTERA.

Allydus calcaratus, L.—Early stages of this bug were found running about with ants (*F. sanguinea*, *F. rufa*, *F. fusca*, *L. flavus*, etc.) at Weybridge, on July 10th. The resemblance of the bugs to the ants was very remarkable.

COLLEMBOLA.

Cyphodeirus (*Beckia*) *albinus*, Nic., was observed with *Tapinoma erraticum*, at Woking, on May 12th; with *F. sanguinea* at Wellington College, on April 17th; in an incipient colony of *F. fusca* var. *glebaria*, New Forest, July 22nd; with *F. fusca* var. *fusco-rufibarbis*, *L. alienus*, *M. scabrinodis* var. *sabuleti*, and *T. caespitum* at Seaton, Devon,

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[39] *Verh. Zool. Bot. Gesell. Wien.*, 1906, p. 415.

[40] *Ann. Soc. Ent. France*, 1870, p. lxiv.

[41] *Ent. Rec.*, 1908, p. 106.

August 2nd; and with *L. niger* at Sandown, Isle of Wight, September 7th.

ARANEINA.

Evansia merens, Camb.—♂ ♂ and ♀ ♀ of this little spider were taken in nests of *F. fusca* on May 1st, I. of Tiree.

ACARINA.

Cillibano comata, Leon.—Observed in my observation nest of *L. umbratus* var. *mixto-umbratus*, from Weybridge, on the larvæ, on June 21st.

Antennophorus uhlmanni, Hall.—A specimen was found on a ♂ of *L. umbratus* in a nest at Weybridge, on September 6th. This is interesting, as it may suggest how the mite may leave the nest. During the marriage flight the mite could transfer itself to the ♀. Specimens have lived in my nest of *L. umbratus* var. *mixto-umbratus* for months, and are still present.

Laelaps myrmecophilus, Berl.—Occurred in nests of *F. fusca* var. *fusco-rufibarbis* at Seaton, August 2nd, and Sandown, I. of W., September 7th.

Sphaerolaelaps holothyroides, Leon.—Was found in my *L. umbratus* var. *mixto-umbratus* nest from Weybridge, in July. It was found in a nest of *L. umbratus* at Aldeburgh by Dr. Nicholson, in April.

MYRIAPODA.

Polyxenus lagurus, L.—Occurred in some numbers in a nest of *F. rufa*, at St. George's Hill, Weybridge, on March 29th.

CRUSTACEA.

Platyarthrus hoffmanseggi, Brdt.—Was observed with *F. fusca* var. *fusco-rufibarbis*, *L. alienus*, *M. scabrinodis* var. *sabuleti*, and *T. caespitum* at Seaton, Devon, August 2nd; with *L. niger* at Sandown, I. of W., September 7th; and in plenty with *F. exsecta*, Parkhurst Forest, I. of W., September 8th. The Hon. N. C. Rothschild sent it to me in a nest of *L. flavus* from Ashton Wold, Oundle, in March, and Dr. Nicholson found it with *L. umbratus* at Aldeburgh, in April. Mr. Standen[42], in some notes on this creature, mentions that his colleague Mr. Hardy has given him some records of the capture of *Platyarthrus*. One of these is "Rannoch, Perthshire: abundant in nests of *F. rufa*." The only other record I am aware of for Scotland is "Banffshire (J. Edward); with *F. fusca* between Inverkeithing and St. Davids, Fife" (Evans[43]). Personally, I have never found it in Scotland, though I have done a great deal of collecting in the Highlands, I have dug up and investigated hundreds of *F. rufa* nests at Rannoch, and this year, in May, I spent five days at Nethy Bridge, doing almost nothing else except dig up *rufa* nests, and I never saw any

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[42] *Lancs. Nat.*, 1912, p. 63.

[43] *Ann. Scot. Nat. Hist.*, 1900, p. 186.

Platyarthrus. Standen goes on to say that Hardy has often found it in the burrows of wood-boring beetles. I trust it will be understood that I am not casting any doubt on the fact that it has been found in Scotland, but I do not believe that the small white woodlice seen by Hardy in beetle burrows were *Platyarthrus* at all. It would be very easy for anyone (especially "without knowing its name, or the significance of its association with ants," as Standen says) to mistake other small white woodlice for it.

MYRMECOCHOROUS SEEDS.

Centaurea cyanus, L.—When staying with Crawley, in July, at Seaton, in Devon, he called my attention to the fact that in his garden the seeds of the blue cornflower were collected by ☿ ☿ of *Myrmica ruginodis* and carried to their nest. The nest, was situated just near the front door, and the ants brought the seeds from quite a long distance. Sernander,[44] in his Monograph on the European Myrmecochorous seeds, records that on August 20th, 1898, at Tosterö, in Sweden, he saw a number of *F. rufa* carrying these seeds, and that they brought them to the nest from a distance of 27m. These seeds possess an elaiosome, which attracts the ants, and belong to his Amberboa-Type[45]. He subsequently carried out experiments[46] with these seeds, and found that when the elaiosome was removed, they were not nearly so attractive to the ants.

FUNGOID GROWTHS.

In a former paper[47] I recorded that I found a colony of *Leptothorax acervorum*, at Rannoch, all the ants of which were covered with a fungus, and I referred to Wheeler's[48] paper on ants infested with *Laboulbenia*. Professor Wheeler has now kindly sent me specimens of *Lasius niger* var. *neo-niger* infested with *Laboulbenia formicarum*. My *Leptothorax*, which I unfortunately lost, had a somewhat similar appearance, but were much more thickly covered with the fungus. On August 11th, at Weybridge, when I had the great pleasure of Professor Wheeler's company we found two colonies of *Lasius umbratus* var. *mixto-umbratus*, very many of the ants of which were infested with a curious dark brown warty growth in patches on parts of the body and legs. This Wheeler said he thought was a fungus unknown to him. I took home a number of ants from one of the colonies and established them in a plaster nest. The ants have done very well, very few have died, and the colony is in a flourishing condition to-day, February 14th. The fungus does not seem to have spread, but rather to have decreased. I had some difficulty in finding specimens much affected when I wanted to send some away alive. I hope to make experiments with this nest this year. I sent specimens in spirit to Dr. Jessie Bayliss Elliott of Birmingham University, who is kindly investigating the matter for me, and subsequently the live specimens mentioned above. Dr. Elliott considered the patches were colonies of unicellular organisms on the outside of the ants, but as she is still working at the matter, it is perhaps best to leave it here, till more definite results have been obtained.

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[44] *Kungl. Svenska. Vetensk. Handl.*, Vol. 41, No. 7, 1906, pp. 143 and 203.

[45] *loc. cit.*, p. 16.

[46] *loc. cit.*, pp. 144-145.

[47] *Ent. Rec.*, 1912, p. 5.

[48] *Psyche*, xvii., 1910, pp.

The Coloration Problem.

By W. PARKINSON CURTIS, F.E.S.

(Continued from page 61.)

So much for the methods of the birds. Now as to the optical capacity of birds, I find that generally it seems to me to be much the same as my own (possibly exactly the same as my own), but where I think the bird's sight differs from mine lies, not so much in what their eyes perceive, as in what the perception conveys to their brain. What do they deduce from what they see, or what response does their organisation give to the stimuli received through their optic centres? *Ex hypothesi*, unless the sight of the insect moving or at rest be coupled with the power to deduce, or the response to the stimulus, that there goes a palatable meal or an unpalatable one, well, the insect might as well not be seen, for both Batesian and Müllerian theories require attacks (*Confer*, Cockayne, *Proc. Ent. Soc. Lond.*, 1911, p. 168).

My own experience confirms the recorded observations of many other observers, the moving insect is attacked where the still one often escapes. I have noticed this particularly with larvæ of cryptic coloration, and I can call to memory one particular instance. I was watching a green caterpillar on a green leaf in my conservatory (I knew the caterpillar, probably a small green *Phlogophora meticulosa*, was there, I had previously seen it), I was also watching *Erithaca rubecula* (the Robin), which with characteristic impudence makes a practice of hunting for food in the conservatory, spending all night there quite happily. I wondered exactly how long it would be before the Robin would find the caterpillar. The problem was soon solved, the caterpillar made a slight (very slight) movement, and the Robin, then several feet distant, hustled across and demolished it promptly. I think that the golden rule with all cryptically coloured animals, and one that they seem to follow with almost unvarying regularity, is, when in presence of danger "freeze," when in doubt "freeze," except when absolutely necessary to move, don't move. Instances of "freezing" habit are perhaps unnecessary, as it is well known, but last Spring on two occasions I surprised Roebuck. I regard Roebuck (*Capreolus capraea*, Gray) as a cryptically coloured animal. The Roebuck, one on the open heath, and one amongst sparse bushes on a heathy brake in a wood, "froze," so did I; on one occasion I stared the Roebuck out, on the other the Roebuck stared me out, but until the animal lost its nerve it never moved a hair and looked for all the world like a dead weather beaten oak stump. Lt.-Col. Manders also agrees that want of movement tends to invisibility. I have heard still elephants likened to termite's nests. On the other hand, when the insect does move, it is instantly attacked. This fact points to the conclusion that the bird recognises the moving butterfly or moth as a palatable meal, or why should the bird trouble to perform the complicated evolutions necessary to enable it to catch the insect. That quick recognition confirms that the bird has tested and found good some previous butterfly or moth, in fact has found it so good as to be worth a great expenditure of energy. (*Confer*, R. I. Pocock, *loc. cit.*, p. 811.)

The sparrows in our garden (and probably in Mr. Colthrup's garden, too) get more food than they can eat, and yet will go through the most astonishing manœuvres to catch *Pieris rapae*, *Pieris brassicae*, and small *Crambites*, and will even try *Sesia* (*Macroglossa*) *stellatarum* (and *Biston hirtaria*, apparently). I have seen *Fringilla coelebs* (the Chaffinch) try *S. stellatarum*, and really it put up a good effort, seeing that *S. stellatarum* can do 60 miles per hour at the least.

This year we have had in one wood ten families of tits in nesting boxes (about 130 head all told)—of course, just at the most interesting period, business prevented observation. One pair, *Parus major* (the Great Tit), came to the box (each bird) every five minutes with an average of five larvæ at a time, *i.e.*, they brought about 120 larvæ an hour. One thing was very noticeable, the larvæ were nearly all green larvæ, very few brown. To my eye the green larva on the green leaf is much easier detected than the brown larva on the brown twig. The brown larvæ are at least as abundant as the green larvæ (actually more abundant, but for my purpose equality will serve). If not better protected why are not more brought? It looks to me much as if the birds' range of perception were similar to mine, but more limited in range. I might add also, from those numerous little indefinable peculiarities of action, that in the long run produce such an impression upon one, and yet are so difficult to put down in black and white as a recorded observation (*confer*, R. I. Pocock, *loc. cit.*, pp. 810 and 811), the birds limit their purview to their immediate vicinity, and do not trouble about things at a distance, even though those things be insects on the wing. My conclusions therefore are :—

(*a*) That a bird's optical capacity is of the same nature as that of a man.

(*b*) That individually its optical capacity may be less critically accurate in the form of the bundle of rays that the optic lens picks up and transmits, or more accurate (as *e.g.*, the Condor). This is a question for the optical surgeon to settle by studying the individual.

(*c*) That the bird's deductive capacity is probably inferior to that of man, and certainly inferior in all-round capacity to that of trained man (*e.g.*, entomologist), who recognises the sitting object as a moth before movement betrays the fact of life. If this conclusion be correct, it would nullify the supposed difficulty with regard to the slight difference in modes of flight existing between model and mimic on which so much stress has been laid (see *Proc. Zool. Soc. Lond.*, 1911, p. 704).

(*d*) That the bird concerns itself only with its immediate proximity or its food area. In the case of small birds this will be close at hand, and in the case of birds like the kestrel will comprise a larger area, but the area, whatever it be, receives practically the undivided attention of the bird. (*Confer*, H. T. Moule, "The Seeing Powers of Beasts and Birds," *Dorset Field Club Proc.*, 1902, p. 52, and Richardson on "Missel Thrush," *loc. cit.*, p. 86.)

Before I leave these remarks I would like to point out to Mr. Colthrup that Owls, Nightjars, and night-feeding birds (particularly *Oedicnemus scolopax*, the Stone Curlew), and bats, have a vision modified for their manner of life, and from all I can see seem to be able to see as well at night as I can in the day-time; so to assume that warning coloration or cryptic coloration is lost on them is entirely gratuitous, and does not account for the fact that according to my experience white night-flying moths, such as *Leucoma salicis*, and *Spilosoma menthastri*, are hardly ever taken. (*Confer* further remarks to much the same end by Rev. K. St. Aubyn Rogers, *loc. cit.*, p. 498).

The following attacks at rest have come under my notice recently, and lest the small number of these be used as an argument against me, let me say at once I pass six days out of seven in an office in a town, and have to get the entirety of my entomological work into the Sundays and occasional vacation times, when this subject, though often present to my mind, cannot receive that systematic attention it deserves. This to some extent also accounts for the appearance of *P. domesticus* so many times, though *P. domesticus* is so far familiar with man as to be very bold in his presence.

1. *P. domesticus* (the Sparrow), July 3rd, 1909. Rose aphis and *Tortrix* larva. At Poole.—This bird was deliberately searching, and is only quoted by reason of that.

2. *P. domesticus* (the Sparrow), July 5th, 1910. A *Tortrix*. Bournemouth.—Insect found by searching leaves of *Ilex*.

3. *Sitta caesia* (the Nuthatch), May 14th, 1911. Small insects. *Crambites*. Bloxworth.—Searching on grass on the ground at the edge of a wood.

4. *Gecinus viridis* (Green Woodpecker), 1911. Small insects, Lepidoptera? Kinson.—Searching in grass on the ground in an open field.

5. *P. domesticus* (the Sparrow), July 3rd, 1911. *Mamestra brassicae*.—Taken at rest amongst herbage at Poole (E. H. Curtis).

6. *Sturna vulgaris* (the Starling), August 3rd, 1911. *Agriades coridon*.—Captured sitting on grass. These insects were chipped or worn, and were released by me in my garden, and settled on the grass, as they were lethargic after confinement in a pill box. It is possible that the starling may have seen me turn them out on the grass, as the attack took place five or ten minutes after they were released; but, if so, the bird was very quick to recognise the provision of an easy meal.

7. *Turdus musicus* (Song Thrush), July 10th-26th, 1912. *Leucania impura*.—Captured in a cornfield and brought to nest, at Wicken, Cambs. The insect was undoubtedly taken at rest, because it was middle day, and the bird flew up out of the corn with the insect, close to where I was standing. (E. H. Curtis corroborates this.)

8. *Locustella naevia* (Grasshopper Warbler). July 10th-26th, 1912. *Crambites*.—Many observed at Wicken. The bird was feeding young in a tangle of brambles. I could not find the nest but watched the bird make repeated journeys to the grass at the edge of a field of barley and return with *Crambites*. It was a dull afternoon. (E. H. Curtis corroborates this.)

9. *Certhia familiaris* (Tree Creeper). May 12th, 1912. *Lobophora halterata*. — Birds feeding young in nest. There were no wings outside the nest, which was in a crack in an ash tree, which crack was opening and shutting about two inches so that I could not put my hand in for fear of getting it crushed. I did not see

the birds carry any wings away. Both parents brought a grey moth about the size of *L. halterata*. On one occasion the female brought three in her bill at once. I was busy over other matters and I could not keep count, but whenever the birds came under my notice returning to the nest they had at least one moth. *Lobophora halterata* was the most likely as the place was suitable, the insect was fully out and the species brought to the nest seemed to me to be *halterata*. If it was not that I think it must have been *Tephrosia bistortata*. The insects were obtained by searching the large upper limbs of the oaks in the vicinity of a birch copse. I could find no *L. halterata* sitting on the birch myself, although on the previous day I had seen several and I put that down to the fact that the night had been absolutely still, under which condition insects fly high and settle high.

I was in the vicinity of the nest from 11 a.m. to 5 p.m. that is, about 60-100 feet away most of the time. Observed at Marlpits, Dorset. (E. H. Curtis corroborates this.)

10. *Emberiza schoenicleus* (Reed Bunting). June 2nd, 1912.—A grey moth about the appearance of *Apamea didyma*.—The bird was feeding full-grown young and found the moth by searching in standing rushes and long grass. Subsequently it brought a green *Noctua* caterpillar, I was unable to keep track of the bird, as when it found it was being watched the young spread and it skulked in the rank herbage and kept out of sight. Any-way we failed to identify the moth, as it was given to the young bird which swallowed it so promptly. Observed at Kniton near Wimborne. (E. H. Curtis first saw this and called to me "What moth has the *schoenicleus* in its bill?")

11. *P. domesticus* (The Sparrow). May 4th, 1912. *Dasychira pudibunda* ♀s, two cripples.—Exposed at Poole on a dark apple stump; one taken after eight hours, the second 48 hours. I consider that the above cited instances support very materially the view that birds do search for insect food, and that Lepidoptera are amongst the orders attacked at rest.

12. *Erithaca rubecula* (Robin). February 16th, 1913.—*Tortricodes hyemana* taken off an oak tree-trunk at Kniton. I saw the robin sit up on a holly stump with a *hyemana* in its bill. I said to my brother, "Did you see that robin?" He replied "Yes, it has just taken an insect off that oak tree-trunk." I said "Watch it, it has gone behind me"; in a few minutes it returned to the same stump with a second *Tortricodes hyemana*. I said to my brother, "Where did he get that one?" My brother said, "Off the same oak." We then hunted the trunk and found a third specimen sitting on some dead honeysuckle that twined round the tree-trunk.*

My brother on reading Lieut.-Col. Manders' paper said "Anyway the sparrows hunt our walls for *Melanippe fluctuata*, and if birds don't hunt systematically why do they hover along rail fences looking under rails? They do not do it for amusement."

It is the fact that on many occasions we have observed birds hovering along rail-fences and looking under rails. This position, as everyone must know, is a favourite position of rest with many *Noctuae*.

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* NOTE.—This was a robin out in a wood away from houses, but robins are notoriously bold in the presence of man, and this one subsequently came to us for crumbs as we were having tea sitting on a bank close to the oak tree above referred to. Most birds would not have dared to catch a second insect so close to us.

Moreover, my brother and I can both aver that we have watched the Dartford Warbler (*Melizophilus undatus*) on several occasions feeding itself and its young on *Catoptria ulicetana*, *Grapholitha plumbana*, and such small fry obtained by a careful and systematic hunt in bushes of *Ulex europaea*. It starts at the ground and works to the top of the bush, and then flies to the next bush and does likewise; yet no ornithological work we possess, or have referred to, says much more than that *Melizophilus undatus* feeds on small insects of various orders.

Although apparently Lieut.-Col. Manders considers attacks during flight are to be considered casual playing, and he seems to regard them in much the same way as some fishermen regard salmon rising to a fly, I differ from him, and will now give attacks that have obtruded themselves upon our notice.

1. *Corvus monedula* (Jackdaw). May 1st, 1908. Bumble-bee sp.—In the Wimborne Road, Bournemouth. Persistent chase. This insect is regarded as distasteful. (See R. I. Pocock, *loc. cit.*).

2. *Aeschna grandis* (Dragon-fly). July 28th, 1908. *Pieris brassicae.*—Queen's Park Golf Links, Bournemouth. (Caddie and partner interfered so the attack was not completed).

3. *P. domesticus* (The Sparrow). July 28th, 1908. *Crambus tristellus.*—Attack unsuccessful. Queen's Park.

4. *P. domesticus* (The Sparrow). August 2nd, 1908. *P. brassicae.*—At Poole. Three attacks. One successful.

5. *P. domesticus* (The Sparrow). August 3rd, 1908. *P. brassicae.*—At Hambledon Hill. Six attacks, all unsuccessful.

6. *Caprimulgus europaeus* (Night-jar)? May 22nd, 1909. *Panagra petraria*, *Cabera exanthemaria*, *Odontopera bidentata.*—Berewood. Wings picked up in the ride.

7. *P. domesticus* (The Sparrow). July 3rd, 1910. *Cidaria testata.*—Bournemouth. The insect was beaten to the ground by the sparrow and then captured.

8. *P. domesticus* (The Sparrow). June 11th, 1911. *Melanippe rivata* or *M. sociata.*—I put the insect up in Break Hill Wood. It was promptly captured.

9. *Chloris chloris* (Greenfinch). July 20th, 1911. *Epinephele jurtina* (*janira*) or *E. tithonus.*—At Stapehill. Observed by E. H. Curtis; the attack was successful.

10. *Cypselus apus* (The Swift). July 21st, 1911. *Vanessa io.*—Released from breeding cage at Poole. Insect evaded the bird. (E.H.C.)

11. *P. domesticus* (The Sparrow). September 8th, 1911. *Rumicia phlaeas.*—At Poole. Successful.

12. *Accentor modularis* (Hedgesparrow). September 26th, 1911. *Plusia gamma.*—At Poole. The bird "muffed" it, and only got a bit of wing. (E.H.C.)

13. *P. domesticus* (The Sparrow). May 17th, 1912. *Melanippe fluctuata.*—At Poole. (E.H.C.)

13. *P. domesticus* (The Sparrow). May 26th, 1912. *Pieris rapae.*—At Poole. (E.H.C.)

14. *Emberiza citrinella* (Yellow Bunting). July 26th, 1912. *Lasiocampa quercûs* ♂.—At Wicken, Cambs. The insect was too nimble for the clumsier bird.

15. *Sturna vulgaris* (Starling). July, 1912. Moth sp.?—Morley Houghton at Wicken, Cambs.

16. *Muscicapa griseola* (Grey Fly-catcher). August 25th, 1912. *Vanessa atalanta.*—Lulworth. We went up a path with some short fir trees on the north side. There were several *P. atalanta* as we went up, sunning on the south side of the trees; we also saw two *Muscicapa griseola.* There were no wings in the path. An hour later we returned, there were two wings coloured side up in the path, one fly-catcher, but *no atalanta!* It was still sunny.

17. *Lanius* sp. (Shrike). September 1st, 1912. *Crambus tristellus.*—I found this insect still alive, threaded shrike-fashion on a sharp sedge, in the same way as I have found butterflies done by *L. collurio.* The insect was alive, and when I cut the sedge managed to struggle off. No shrike was seen in the vicinity, but I have not the smallest doubt that a *Lanius* was responsible.

(To be continued.)

A few Notes on Lepidoptera in the Middlesbrough District in 1912.

By T. ASHTON LOFTHOUSE, F.E.S.

Unless otherwise stated the following notes refer to insects taken at Middlesbrough or in a locality a few miles from Middlesbrough, which is well wooded and includes large tracts of moorland reaching to an altitude of about 900 feet above sea level. The woodland consists of large areas of spruce, larch, Scots fir, and other conifers, interspersed with mountain ash and a little birch in various stages of growth, and on the lower slopes are a good extent of alder in places with oak, elm, sycamore, sallows, and in a restricted area a few aspens. With the exception of April the weather prevailing from Spring to Autumn in this district was of the worst description, there being rain almost every day and necessarily the sun appeared on very few occasions; although the weather was anything but ideal, by working in sheltered places a fair number of interesting *Tortrices* and *Tineina* were obtained, my attention being principally devoted to working the Micro-lepidoptera, some of the species taken being additions to the Yorkshire list.

The first species noted were *Hybernia leucophaearia* and *Phigalia pedaria* at rest on tree trunks on February 25th.

On March 3rd, *Leptogramma literana* occurred on alder trunks in an alder and birch plantation, the greenish-grey form without black markings. A few *Coccyx strobilella* were bred towards the end of April from spruce cones collected earlier in the year. *Phoxopteryx lundana* were taken on May 11th, and also the second brood specimens on August 31st. *Eupithecia indigata* were found on fir trunks on May 18th, on which date the following were also noticed:—*Hadena glauca*, *Tephrosia biundularia* on larch, *Retinia turionana**, a single specimen fresh out, at rest on a fallen fir trunk near a recently planted fir plantation, *Catoptria ulicetana* freely, and *Stigmonota internana* about gorse, *Cnephasia politana* and *C. musculana*, *Capua favillaceana* flying in the sun about dead bracken, among bilberry and near oak trees, and *Nemophora schwarziella* flying about over bilberry. I also took a few larvæ spun up in evergreen bilberry (*Vaccinium vitis-idaea*) from which *Tortrix fosterana* were bred later, and from mined leaves of the same plant I bred *Lithocolletis vacciniella* at the end of June, together with several ichneumons. *Eupithecia fraxinata* was bred on May 19th and until the end of the month. From a pairing I obtained ova, which hatched out on June 19th, and the larvæ of which had mostly pupated before August 2nd. *Stigmonota dorsana*: this *Tortrix* occurred fairly freely on the afternoon of May 25th, which was fine and warm, flying from 3 to 4.30 p.m. on a railway embankment. The males fly very rapidly, but the females, of which a few were taken, are more sluggish and more often found sitting about on the plants. Two or three interesting aberrations were taken, two specimens having the dorsal blotch divided into two parts, and one with the dorsal blotch reduced almost to spots. The wonder is how this species continues to exist in the locality, seeing that the herbage is annually cut close down for hay early in July. *Ephippiphora cirsiana* was also flying in this locality at the same time, *Glyphipteryx fuscoviridella* simply swarmed, a few *Micropteryx calthella* and a single specimen of *Coleophora fabriciella* were noted.

On June 1st, *Penthina pruniana* and *Pardia tripunctana* were beaten out of hedges, *Phoxopteryx myrtillana* were met with among bilberry and *Incurvaria muscalella* were flying about fir trees in late afternoon. *Adela viridella*, *Gelechia ericetella* and *G. longicornis* occurred among heather, and several *Glyphipteryx fischeriella* were flying in early afternoon about gorse in a hedge bank. *Swammerdammia combinella*, *Argyresthia curvella* and *Laverna hellerella* were found in a garden at Middlesbrough on June 6th. Specimens of *L. atra* occurred about apple trees flying just before dusk early in August.

On June 15th, *Tinea weaverella** occurred among fir trees. I had previously taken specimens in 1911, when Mr. B. A. Bower visited the district with me and suggested that the specimens were probably this species and not *T. rusticella*. On going through my series of *T. rusticella* I found that they were all but one referable to *weaverella*.

Argyresthia conjugella occurred freely about mountain ash until well into July, I also took a few specimens of the unicolorous dark bronzy-fuscous form ab. *aerariella*. *Spilonota trimaculana* first occurred on June 16th. *Hedya neglectana* was found resting on poplars, fencing, etc., on June 18th and throughout the remainder of the month. *Eubolia plumbaria* was flying about gorse on June 22nd, and *Acidalia fumata* occurred among bilberry, *Melanippe tristata* *Tortrix viburnana* also among bilberry, *Mixodia schulziana* on moors, *Eupoecilia maculosana*, *Phoxopteryx mitterpacheriana* and *Ocnerostoma piniariella*, the last beaten out of firs. *Tortrix costana*, *Elachista luticomella*, *E. cerusella*, *E. triatomea* and *Bryotropha senectella* were taken in some marshy ground near Middlesbrough on June 27th, and on the same date *Tortrix unifasciana* was taken in the garden, this last occurring very plentifully after this date.

On June 29th I noticed *Bombyx quercûs* var. *callunae* ♀, flying in early evening; other species noted on this date being *Retinia pinivorana* among pines, and also *Stigmonota coniferana* of which I took odd specimens flying about Scots fir or beaten out of the branches on two or three subsequent dates, the last taken being a perfectly fresh ♀ on August 3rd.

Coccyx vacciniana, *Gelechia confinis*, about burnt heather on moors, *Bryotropha desertella*, a single specimen of *Brachycrossata cinerella*, and *Cedestis farinatella* were met with. Of *Dichrorampha tanaceti*, several were taken flying about *Achillea millefolium* in the garden about

6 p.m., and it occurred pretty freely on the following few days; I noticed some of the empty pupa cases pushed out from about the roots of the plant.

On July 4th, *Grapholitha subocellana* occurred about *Salix*, and on July 6th I took a freshly emerged specimen of *Plusia interrogationis*. A few *Coccyx nanana* were flying round tips of spruce trees in the sun about 2.30 p.m., I have also seen them flying in the sun about 6 p.m. *Coccyx taedella* occurred freely about spruce trees flying at early dusk. Some very nicely marked specimens of *Nudaria mundana* occurred on the stone walls on July 7th, on which date *Scoparia murana* was taken.

On July 8th, I took *Eupithecia minutata* and *Argyresthia albistria*, and *Nannodia stipella* was beaten out of fir trees.

On July 9th, several *Hedya lariciana* were taken, and during the next two or three weeks, but it never occurred commonly, I noticed them flying about the upper branches of larch trees from one to two hours before dusk. *Paedisca occultana* was fairly common among larch and fir, fresh specimens being taken up to August 31st. When beaten out, this *Tortrix* usually shoots out obliquely and down into the herbage. *Coleophora laricella* and *Argyresthia atmoriella** were met with. This last species, which is not described in the books on Micro-lepidoptera available, was pointed out to me last year by Mr. Bower when he visited the disrict; it occurred fairly freely, and very visible traces were noticed of its having been feeding in the tips of the larches.

On July 10th, *Argyresthia sorbiella* was noticed about mountain ash trees with specimens of *Ornix scoticella*. *Cucullia umbratica* was bred on July 11th. *Tortrix cinnamomeana* occurred sparingly on July 13th, and subsequently; *Amphisa gerningana*. *Penthina sauciana* occurred in considerable numbers on this date, flying in the early afternoon about bilberry; I have also noticed them flying about noon. *Grapholitha nigromaculana* occurred about ragwort, *Sciaphila subjectana*, *Catoptria cana*, and *Argyresthia ephippella*, the latter were very plentiful flying about bracken, etc., in early evening (although it was foggy and very damp) near a wild cherry tree which, when tapped, simply swarmed with them.

On July 14th *Coremia munitata* and *Cidaria populata* were noticed, while *Crambus margaritellus* and *Bactra lanceolana* occurred freely in suitable localities. I took one or two nicely marked forms of the latter. *Peronea caledoniana* was taken here, a rather early date for this species, which was taken in pretty good condition and more commonly on August 17th. *Sericoris lacunana* was a perfect pest on the moors; *Pamplusia mercuriana* was captured and *Grapholitha penkleriana* occurred commonly about hazel and alder until September. *G. geminana* occurred about bilberry and later was by far the commonest *Tortrix* about this plant.

On July 15th I took a single specimen of *Ephippiphora trigeminana* at rest on a fence, *Teleia dodecella* was beaten out of firs about this date, *Bryotropha politella*, *B. terrella* and *E. brunnichiana* were met with on 16th, and of *Sciaphila sinuana* a few were beaten out of firs, and of course *S. virgaureana*.

On July 17th *Anaitis plagiata*, *Scopula olivalis*, *S. prunalis* and *Scoparia ambigualis* were common. A single specimen of *S. crataegella* was taken on an oak tree-trunk. *Tortrix viridana* was not so common as it usually is, and the oak trees did not show such signs of the ravages of the larvæ of this and other species as is sometimes the case. I took three specimens of the pretty Tineid *Cerostoma sequella* off sycamore tree-trunks. During the next fortnight about two dozen specimens were taken in a very restricted locality, and in every instance but one off the trunks of sycamore trees, although other trees occurred close to them.

On July 18th *Vennsia cambrica* and *Olindia ulmana* were beaten out. Several specimens of *Scardia corticella* were taken off two decayed alder trunks (one tree), and during the next fortnight, I noticed a good number more, all restricted to this one tree.

July 20th gave me *Asthena blomeri*, *Dictyopteryx loeflingiana*, and *Penthina corticana* on birch. *Grapholitha cinerana** occurred during the next fortnight, and I took about a dozen specimens of this *Tortrix* almost without exception resting on aspen trunks and consisting of two forms, the grey and the grey with black markings. It was noticeable that this species was out and over before *G. nisella* commenced, and that none of the forms of *nisella* taken were in any way similar. *Prays curtisellus*, *Cerostoma vitella* about wych elm, and *C. costella* about wych elm and hazel occurred at this time.

On July 25th I took *Argyresthia pygmaeella* in the garden at Middlesborough, it being very wet and cold weather for some days about this time.

On July 27th I took a single specimen of *Paedisca rufimitrana** in fine condition.

On August 3rd *Ellopia prosapiaria* and *Larentia olivata*, *Paedisca corticana* and *Scardia arcella* were beaten out. *Ochsenheimeria bisontella* occurred on a grassy hill-side flying about 2 p.m., and *Batrachedra praeangusta* was on oak and aspen tree-trunks, principally the latter.

On August 5th *Tortrix xylosteana* occurred among oaks, *Paedisca solandriana* was beaten out of hazel, and *Phibalocera quercana* out of oak.

On August 17th *Oporabia filigrammaria* occurred on the moors, *Grapholitha ramella* and its dark variety about birch, and *G. nisella* about sallows in a very restricted locality. A variable series of this last pretty *Tortrix* was taken during the next few days. They were usually found at rest on the sallow trunks but had a habit of darting off or dropping suddenly to the ground, and were most difficult to follow. *Lita fraternella*, *L. atriplicella* and *Cemiostoma spartifoliella* were also taken on this date.

On August 24th I met with *Cidaria immanata* and *Lita maculea*, two specimens.

August 25th produced *Opostega salaciella*.

August 31st *Polia chi* was taken, *Teras caudana* was beaten out, including the two or three varieties of this species, *Peronea schalleriana*, *Depressaria costella* and *Argyresthia nitidella* were met with, *Chelaria hubnerella* was beaten out of hazel, *Oecophora fulviguttella*, and *Elachista atricomella* were common in a swampy locality.

On September 8th two specimens of *Eupithecia fraxinata* were bred from this year's larvæ.

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* Denotes species that appear to be additions to Mr. Porritt's List of Yorkshire Lepidoptera.

In concluding these few notes I must acknowledge the assistance I have received from my friends Mr. John Gardner and Mr. B. A. Bower, and others in the naming of the more obscure species.

Records of Local Coleoptera. II.—Hydrodephaga.

By G. W. NICHOLSON, M.D., F.E.S.

I propose next to deal with the water-beetles. As, however, I must confess to having hitherto neglected these, except on my visits to the Cambridgeshire fens, the present list will prove but a meagre one. I do not propose to enumerate the majority of my Wicken captures, since, although I have found nearly all the local rarities, these are well known to occur there.

A. Haliplidæ:—*Brychius elevatus*, Pz., Shelford, Cambs.; *Haliplus obliquus*, Er., Gravesend; Aldeburgh, Suffolk; *H. confinis*, Steph., Epping Forest; *H. mucronatus*, Steph., I have on several occasions taken a single specimen in drains on Burwell Fen, but never at Wicken; *H. fluviatilis*, Aubé, Hartley Wintney, Hants.; *H. striatus*, Sharp, Gravesend; *H. immaculatus*, Gerh., Godmanchester, Hunts.; Gravesend, by far the commonest species of the genus; *H. wehnckei*, Gerh., Wicken Fen and Bishop Stortford; *Cnemidotus impressus*, F., Gravesend. Mr. Balfour Browne has confirmed the difficult species of *Haliplus*.

B. Dytiscidæ:—*Hydroporus flavipes*, Ol., Hartley Wintney; *H. oblongus*, Steph., Balrath, Co. Meath; *H. umbrosus*, Gyll., Wicken Fen; *Agabus conspersus*, Marsh.; exceedingly common at Gravesend; *A. abbreviatus*, F. Mr. Dollman very kindly gave me a plan of where he had captured this species at Soham (*Ent. Mo. Mag.*, 1913, xlix., 14). When I visited the spot, however, on May 15th, 1912, it was dried out. It was with much pleasure, therefore, that, a few days later, I netted a couple of specimens in a small pond on Wicken Fen. *Platambus maculatus*, L., I once took a specimen in flood-refuse on the towpath at Kew; *Ilybius fenestratus*, F., Bishop Stortford, Herts.; *Rhantus grapii*, Gyll., Pulborough; *R. pulverosus*, Steph., Wicken and Burwell Fens; *R. notatus*, Berg., very common at Gravesend; *Dytiscus circumflexus*, F., Gravesend.

On the Shedding of the Cornuti in Pyrausta aurata, Sc.

(*With four plates.*)

By T. A. CHAPMAN, M.D.

In the *Entomologist's Record* for 1910, at p. 53, I gave an account of certain remarkable structures in *Peridea trepida*, which are transferred from the male to the female in pairing, and referred to various other species in which similar occurrences in a less extreme form take place.

Some of these are well known to various observers, but I do not know of any actual record of them in any English publication. I take courage therefore to report one of these, which I investigated some years ago. The species I have selected is *Pyrausta aurata* (*punicealis*). There are one or two other species of the genus in which the same facts may be observed. These are within the genus *Pyrausta* as restricted by Stainton and Barrett. In the species included, beyond

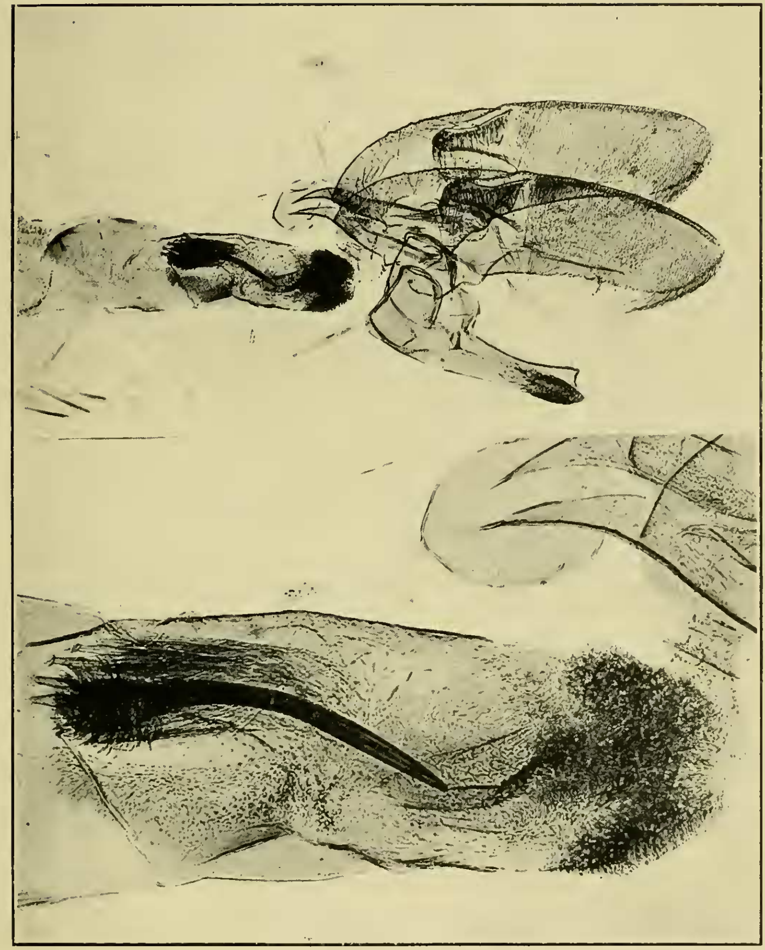


Photo. F. Noad Clark.

Genitalia of Pyrausta aurata ♂, Cornuti present.

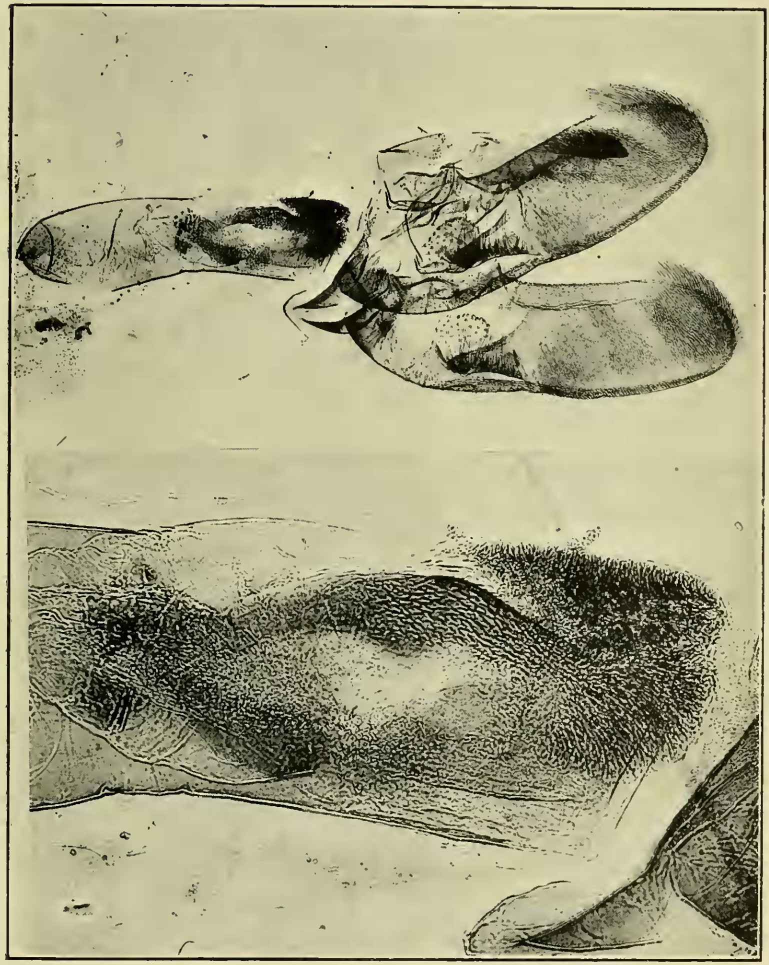


Photo. F. Noad Clark.

Genitalia of Pyrausta aurata ♂, Cornuti shed.

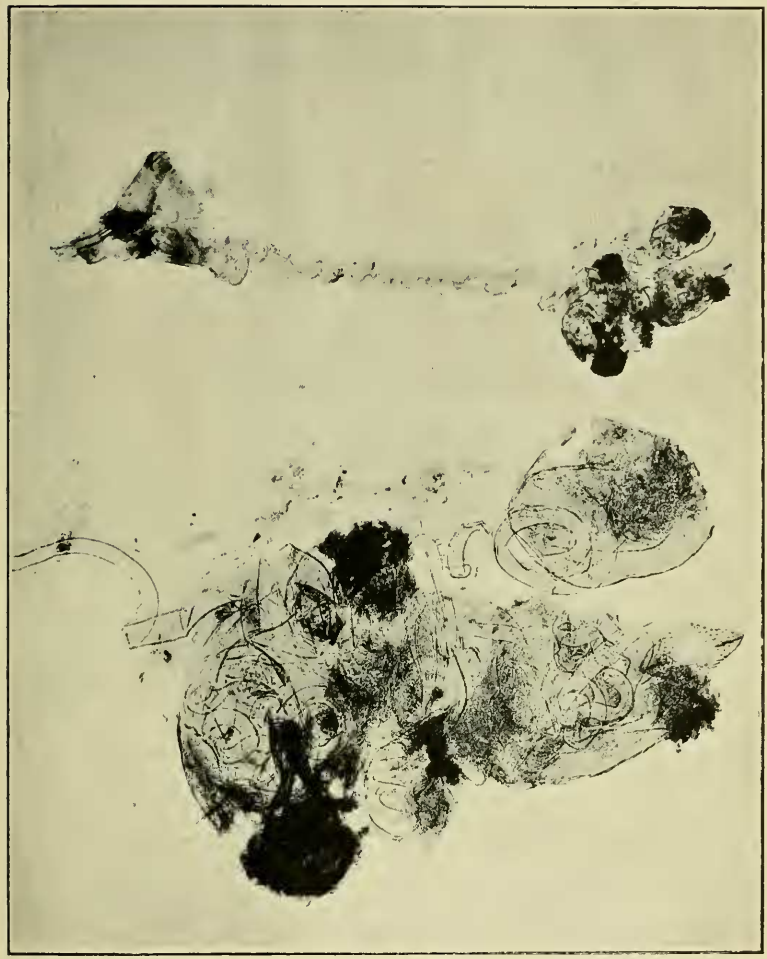


Photo. F. Noad Clark.

Genitalia (bursa) of Pyrausta aurata ♀, containing cornuti.

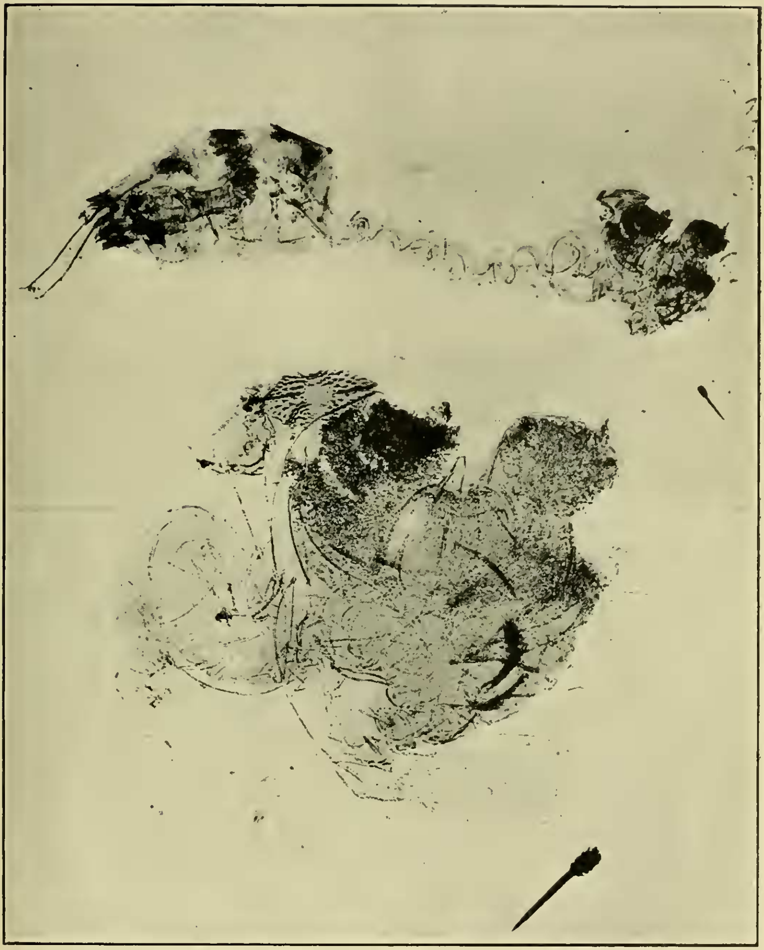


Photo. F. Noad Clark.

GENITALIA (BURSA) OF PYRAUSTA AURATA ♀, CONTAINING CORNUTI.

these, in the extended genus by Staudinger and Meyrick (really Hampson, *Pro. Z. S.*), I have not met with the arrangement, but I have of course only examined a few of the very numerous species.

In these Pyraustas the eversible membrane that Pierce calls the "vesica" and has by some been called the "penis," a name often applied to the ædœagus, but which really should be used only for these two structures taken together, is of very great length, and possesses at one point, which in quiescence is accommodated within the ædœagus, an armature of cornuti.

In the only species I propose to refer to at present, *Pyrausta aurata* (*punicealis*), the cornuti consist of one comparatively very large spine and a number of smaller ones.

These are well seen in Plate IV. In fig. 1 their general relationship to the whole male appendages is seen (× 30). In fig. 2, the portion of the ædœagus containing them is magnified by 100. The large spine is seen to be nearly 0·5mm. long, smooth, curved, and pointed, basally it is somewhat bulbously expanded, and is clothed with short hair-like processes, resembling a bottle-brush. The smaller cornuti are less deeply chitinised, and, therefore, more transparent, but the bases and attachments of a few of them are well shown; they are about 0·2mm. long. Such is the appearance of the male structures before pairing has taken place. After that has taken place appearances are as shown in Plate V., where the same parts, at the same magnification, show very clearly the points of attachment of the cornuti, but the spines themselves are conspicuous by their absence.

When we examine the female structures we find a reversal of all this; in a female that has paired we discover the presence of these cornuti, of which no trace exists in the virgin state. I have not thought it necessary to present photographs of the parts when the cornuti are absent as they really show nothing except that the cornuti are not seen, but I present photographs, Plates VI. and VII., of two specimens after pairing. Fig. 1, in each plate, shows the terminal segments of the abdomen, the extremely long, coiled, and convoluted duct connecting these with the *bursa copulatrix* and other associated structures, of the details and uses of which I am very ignorant. In Plate VI. the enlarged photograph of the bursa and associated parts shows that the duct, of which Fig. 1 has demonstrated a lengthy portion partially free, continues a further complicated series of convolutions that are held together in some way that does not affect the lower portion, and obscures several sacs associated with the bursa proper. This bursa I take to be the sac marked by the spiculated plate seen to the right side of Fig. 2, whilst the male cornuti are contained in a mere structureless sac, where they may be seen towards the left lower portion of the preparation.

In the other example, Plate VII., much the same conditions are seen, the large spine has, however, escaped by a rent made in mounting the preparation from a transparent sac that is not the one carrying the spiculated plate, whilst the smaller cornuti are held in another portion of the convoluted mass. The large spine has turned round in the interval of taking the two photographs, the medium used in mounting having been still rather fluid.

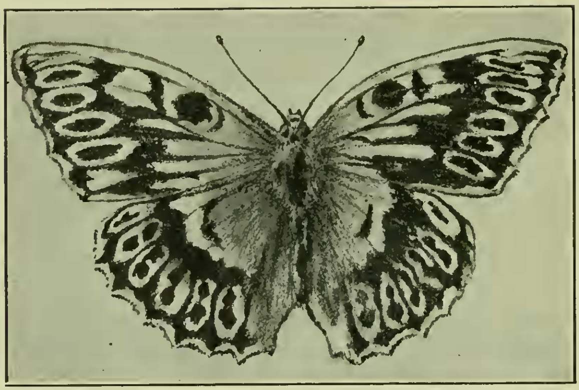
How are these spines conveyed through the great length of coiled tubing from the exterior to these places so far from the surface?

The tube forming the "vesica" must penetrate all the way, and not only so, but must do so as a double tube, *i.e.*, the tube as it enters must gradually be everted, precisely as the whip-like tails of *Cerura* larvæ are everted, only the process is not completed as in the puss-moth larva, but there is still within the outer portion of the tube when the process is complete, a part of the inner portion. The ♂ tube engaged must therefore be of practically twice the length of the ♀ tube. In this way there is no gliding of the wall of the ♂ tube along that of the ♀, each portion of the ♂ tube as everted will remain at the point of the ♀ tube where it is everted, the process being continued by the inner portion of the ♂ tube pushing forward to be everted in its turn. This process would go on until the portion of the tube carrying the cornuti becomes everted in the sac or sacs of the bursa. In this way the cornuti do not, as one is inclined at first to think must be necessary, pass up the ♀ tube as an advance guard, themselves in contact with the ♀ tube and rubbing along it, and presenting terrible difficulties of the sharp points catching in or even piercing its walls. Between them and the ♀ tube are the double walls, the direct and the inverted, of the ♂ tube (or "vesica"), and the only parts that slide over each other are the opposed visceral surfaces of the ♂ tube, those of the part already everted that is at rest as a lining to the portions of ♀ tube already penetrated, and of the portion that is still advancing within the portion at rest.

When the male tube is withdrawn the corunti present no greater difficulty theoretically to be withdrawn with it, than they did to their entrance, and as a matter of fact, in many insects there are very elaborate and complicated spines arising from the vesica, that are so withdrawn after having served their purpose, whatever it is.

In our *Pyrausta aurata*, however, it has obviously been of some advantage not to withdraw the cornuti with the tube, but to leave them behind. Possibly where the tubes are so lengthy and convoluted, as in this species, the withdrawal is easier without them and can consequently take place more rapidly, and may thus present some advantage under circumstances of danger when each insect may more readily escape, if rapidly liberated, to seek safety.

I may remark that my idea of how these cornuti are introduced is purely theoretical, deduced from examining the structures. It seems, however, to be at variance with the fact that the position of the cornuti within the ædœagus suggests that they lead the way and advance in front unsheathed. The question seems to me one that may perhaps be solved by further observation, which will, however, be very difficult. The real support of my theory is that one does often see the vesical tube extended by this process of eversion, and that unquestionably wherever it extends to in the female passages it does so as a double tube. It is also in full agreement with the scheme of these parts that is expressed by Dr. Sharp, *Trans. Ent. Soc. Lond.*, 1912, p. 600, in the statement that the ♂ tube forms "a perfect tube without orifices." He describes the apparent orifice as due to "the invagination of the tube into itself." The process of penetration, which I have attempted to describe above, might be more simply defined as the evagination of the tube.



Del. Miss Carnegie-Cheales.

Dryas paphia ab. (slightly enlarged).

Aberration of Dryas paphia. (*With plate*).

By ALFRED SICH, F.E.S.

This very handsome aberration of the male of *Dryas paphia* was taken by Mr. J. A. Carnegie-Cheales, near St. Aguan, in the Department of the Yonne, in France, in July, 1907. It had apparently recently emerged from the pupa and was found resting on the grass beside the border of a wood. The figure is reproduced from a beautifully coloured drawing from the brush of Miss Carnegie-Cheales. The ground colour is normal, but the usual black markings are developed to an extraordinary extent. In the type there are three small sub-costal dashes in the forewing, in this specimen the central dash has become a large conspicuous spot. The black scaling on the veins of all the wings is very much increased, especially towards the margin. The spots and lines beyond the centre of the wings have coalesced and form irregular black bands. The antimarginal spots beyond the bands have also coalesced but horizontally. Those on the forewings appear as elongate ovals, while those on the hindwings assume the dumb-bell shape. It is said, " variety is pleasing," and this magnificent specimen forms no exception to the rule.

An account of the Breeding of Amphidasis betularia and ab. doubledayaria.

By Miss E. MILLER.

In the early morning of June 15th, 1910, I captured a pair of *A. betularia* from the side of our dining room window; the female being a lovely black ab. *doubledayaria* of medium size, and the male of the usual light type and rather small. The female laid several hundred ova in about three days, and the larvæ commenced to emerge on July 1st, when I sleeved them all out on plum, white willow, elm, birch and oak. A considerable number of the larvæ died in all stages, more especially those fed on plum and white willow. I have noticed before, and also in this case, that many *A. betularia* larvæ when fed on plum are green in colour and greatly resemble the young plum twigs. The moths emerged as follows:—

		Ab. *doubledayaria*.	Type.	
May	16th,	1 ♂ + 1 ♀	1 ♀	rather dark.
,,	17th,	1 ♀	1 ♂	
,,	18th,	1 ♀		
,,	20th,		1 ♂	
,,	22nd,	1 ♀	2 ♂s + 1 ♀	
,,	23rd,	2 ♀s	2 ♂s	
,,	24th,	4 ♀s	7 ♂s	
,,	25th,	3 ♂s	3 ♂s + 1 ♀	
,,	26th,	1 ♂ + 1 ♀	3 ♀s	with darker markings.
,,	27th,	1 ♂	1 ♂ + 1 ♀	
,,	28th,	3 ♂s + 1 ♀	3 ♂s +	
,,	29th,	3 ♂s + 2 ♀s	1 ♂ + 4 ♀s	
,,	30th,	2 ♂s	1 ♂ + 1 ♀	
,,	31st,	2 ♂s	3 ♂s + 4 ♀s	
June	1st,	1 ♂ + 2 ♀s	1 ♀	
,,	2nd,	1 ♂	1 ♂ + 1 ♀	

,,	3rd,	3 ♀s	...	2 ♀s
,,	4th,			1 ♀
,,	5th,		...	1 ♂
,,	6th,	1 ♂ + 2 ♀s		
,,	7th,	1 ♀		
,,	8th,	1 ♂ + 2 ♀s	...	2 ♀s
,,	9th,			2 ♀s
,,	10th,	1 ♀	...	1 ♀
,,	11th,	1 ♂ + 1 ♀	...	1 ♀
,,	12th,	3 ♀s	...	3 ♀s
,,	13th,	3 ♀s	...	1 ♂ + 1 ♀
,,	14th,			
,,	15th,	1 ♂ + 2 ♀s	...	1 ♂
,,	16th,	2 ♂s	...	2 ♀s
,,	17th,	1 ♂	...	3 ♀s
,,	18th,	1 ♂ + 1 ♀		
,,	19th,			1 ♀
,,	20th,	3 ♀s	...	2 ♀s
,,	21st,	1 ♂ + 1 ♀	...	1 ♀
,,	22nd,	1 ♀	...	1 ♀
,,	23rd,	2 ♀s		
,,	24th,			
,,	25th,			
,,	26th,	1 ♀		
,,	27th,			
,,	28th,			
,,	29th,	1 ♀		
,,	30th,			
July	1st,			
,,	2nd,			
,,	3rd,	1 ♀		2 ♀s
		27 ♂s+45 ♀s	...	29 ♂s+43 ♀s
		72		72

Of this number exactly half (72) are of each type; of the ab. *doubledayaria*, 27 are males and 45 females, and of the light type 29 are males and 43 females.

[I have to thank Mr. Turner for submitting these interesting notes to me for comment. The facts are quite in agreement with previous records of broods of *A. betularia* reared from parents, one of which was of the type form, while the other was of the var. *doubledayaria*. The late Mr. A. Harrison records a brood reared from eggs laid by a type ♀ crossed with a *doubledayaria* ♂:—50 *doubledayaria* = 45·9%. 54 type = 54·1%.

A brood I reared from wild parents, type ♂ and *doubledayaria* ♀ gave 109 *doubledayaria* = 47%. 123 type = 53%.

The Mendelian expectation in regard to these and Miss Miller's brood would be either all black or all of type form, if one of the parents happened to be a pure dominant (I think I am right in saying that the question is still open as to which form acts as dominant and which as recessive in the case of *A. betularia*) or, if one parent was a

D.R. (heterozygote) and the other a recessive the result should be 50% of each form. Of course none of these breeding results afford any direct evidence for or against the Mendelian Theory of Heredity, as the results are equally explicable according to the Galtonian Theory in the case of segregating characters. Miss Miller's brood is, however, a further addition to the evidence already large, which suggests an undue preponderance of dominant recessives (heterozygotes) among wild moths which exhibit melanism, a feature of the evidence which I do not recollect ever to have heard explained by any of the supporters of the Mendelian Theory of Heredity. The details of emergency while affording interesting and valuable data for later statistical work, which will no doubt be undertaken in Entomology as in other branches of science, do not suggest any obvious comment as they stand.—A. Bacot (F.E.S.).]

Lepidopterology.*

By Dr. T. A. CHAPMAN, F.Z.S.

This thick and sumptuous volume is not second to any of its predecessors; it is not first only in-so-far that each Fascicule has different interests to the others, and so it is impossible to compare them. There are 355 pages of text, 64 coloured plates, and 69 of reproductions of photographs.

The preface is devoted to the subject of "No description valid without a figure." It was obvious at the Oxford Congress that it is no use kicking against the pricks, and just as Mendel's discoveries were treated with contemptuous silence for 35 years, or as M. Oberthür tells us about the reception of Rambur's discoveries amongst the skippers, which have been still longer in fructifying, so must the principles underlying M. Oberthür's demand become more generally appreciated before anything practical can be done. As we become more and more overwhelmed with the flood of descriptions of new species, of which the number yet to be described much exceeds that of those we already know, so will the brevity and precision of figures as compared with descriptions be more valued. It may be further noted that there is, year by year, an increasing practical acquiescence in M. Oberthür's views, figures of the whole insect and anatomical and other details are more and more used, so that it seems highly probable that, though Oberthür's formula may continue to be refused acceptance, we may wake some morning to find that it has been all but universally adopted.

In the next section is a note by M. Serge Alphéraky proving that a sub-genus is really irrational and impossible. Various of his statements, by the way, are open to criticism, possibly because they are framed with a view to the point in question, rather than to mere general consideration.

Parts of his argument read as if a "genus" had first to be recognised and defined, and then it had to be seen what species would go into it. It seems to us to be precisely the reverse; first decide what species group themselves together as a genus, then define the genus on their characters, not forgetting that such definition may require amendment on another species of the genus being recognised. The truth is, not that a genus is something in nature that we have to discover, but that it is merely a group of species that seem to be more closely allied to each other than to other neighbouring groups. It should further be accepted that if such a group be inconveniently large, it may be divided into several genera, that are more closely allied to each other than genera, as usually accepted, are. Such genera (often called sub-genera) may be accepted even if not separable from each other by very crisp definition, or, as it is more usually regarded, if there are species that are more or less intermediate. Even in the most "natural" genera, it should be recognised that there is great room for the question of convenience and for the personal equation, and that any attempt to completely eliminate these factors must fail and is at the root of much of the difference of opinion that exists.

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* *Études de Lépidoptérologie comparée*, par Charles Oberthür, Fasc. VI., Rennes, Juillet, 1912.

To take an instance referred to by M. Alphéraky, the Vanessas, if there were only the British species, convenience requires they shall all be Vanessas, including even *Pyrameis*. But when we deal with the species of the world it is very desirable to divide them. Equally some persons may say that larval and other characters, that carry generic weight elsewhere, require these species to be divided amongst several genera, even if we had only the British species to deal with. There is nothing in the facts themselves to say one or other of these views is right. What is convenient must follow general opinion. The personal equation must be dealt with by mutual toleration.

Then follows "Observations sur les Hespérides du Genre *Syrichthus*." this section begins with a personal reminiscence of how great a change has come over our views on many entomological questions since the author became a member of the French Society more than 50 years ago. He relates how Rambur, in 1858, diagnosed with accuracy various species of *Syrichthus* by the anatomy of their genitalia, yet neither Boisduval, Duponchel, Guenée, nor Graslin, though certainly well aware of Rambur's work, paid the slightest attention to it, and treated it as non-existent, and that it was left until the present day for Dr. Reverdin to show the soundness of Rambur's position and carry the elucidation of the genus *Syrichthus* to the extent with which we are now all familiar. M. Oberthür praises the high merit of Rambur in being so far in advance of his age, and gives full recognition and well deserved praise to the work of Dr. Reverdin. He gives us, by the way, interesting reminiscences of A. Constant and C. Jourdheuille, though Constant had very high scientific accomplishments and was a man of much learning, and as all who have met him will agree, a most amiable and instructive companion, he always regarded varieties and aberrations as unworthy of notice or study.

M. Oberthür found he and M. Jourdheuille were absolutely at antipodes in this matter, M. Jourdheuille stating that he sought for his collection the largest, most beautiful, and the most normal specimens. After some remarks on the value of the genitalia in recognition of species, the species of *Syrichthus* are dealt with in geographical groups. 1. The North American group includes four species of Boisduval's, of which figures are, for the first time, given in this volume. 2. South America. 3. Europe, Asia, and North Africa follow, the latter are subdivided into (*a*) Asia and Eastern Europe, and (*b*)

Western Europe and Algeria. 4. Tropical Africa. Under each of these is a list of species with historical and critical remarks in most cases, much of which one would desire to quote if space allowed.

Article III. is a translation from *The National Review of China* (Shanghai) on the region of Ta-tsien-lou, prefaced by some introductory notes, and by a communication from the late Père Déjean. IV. deals with the Zygænas of Central Italy, and a paper by Signor Orazio Querci on these is given in Italian and in French translation, and V. an important communication on *Zygaena transalpina* and its variation by Count E. Turati occupies twenty pages and refers to the figures in Pl. LXII. in the fifth fasciculus.

There follows, as Section VI., a most interesting account of a new *Arctia* discovered by Mr. H. Powell in Algeria. It is allied to *Cymbalophora pudica*, a common South European moth, notable for squeaking when on the wing. The new species *Tympanophora haroldi* (Harold Powell) Oberthür, is apparently very rare and local in Algeria, yet Mr. Powell found an area of some two or three square miles in which the larvæ swarmed to such an extent as to totally destroy the barley crops and clear off much grassy and other herbage. Mr. Powell's observations are of great interest, he deals with the life-history in detail, and his account of the way in which the male repeats his cry when approaching the female, and the less loud replies of the female, of his investigations of the structures by which the sound is produced, and of various other details of structure and habits, makes such a record of curious facts and persevering observations, and is set forth in so clear and simple a manner, as is quite a luxury to read.

There are next some 80 or 90 pages of "Revision des Phalénites," continuing the account of Guenée's types, and referring to 225 figures on Plates CXLIV to CLX.

The next ten plates give figures of exotic butterflies chiefly from Central Asia, but also from Africa and South America. These are all dealt with in the explanation of plates.

Then follow thirteen plates of varieties of Arctias, *flavia*, *hebe*, *villica*, *caja* (six plates), *purpurata* and *dominula*, of which a number of *villica* and *caja* are from British examples, some of which suggest big prices at Stevens. These plates are in illustration of the treatment of the Arctiids in Fasc. V., and details are given in the explanation of plates. Varieties of *caja* have been much figured, but nowhere else is there so large a collectien of varied forms so beautifully presented as here. There are four or five more plates of chiefly non-European Arctiids (not varieties) including *Tympanophora haroldi*, with its semi-apterous female. Then follows a plate of varieties of *S. menthastri*, under the name of *lubricipeda;* most of these examples are British. In Vol. V., M. Oberthür gives his reasons for believing this species to be really the *lubricipeda* of Linnaeus, and that Esper was in error in applying that name to the species to which we now apply it. It appears, however, from what M. Oberthür says, that Linnæus, by his reference to Roesel, included both species under *lubricipeda*, though his description was taken from *menthastri*, Esper. It was, therefore, quite within his right for Esper to retain the Linnean name for either species, renaming the other, besides which Esper was the first to figure the insects under these names, though M. Oberthür apparently regards Linnaeus as not coming under his rules as to figures being more authoritative than descriptions.

There are next several plates of Satyrids and other butterflies.

Plate CXXVII. represents several striking cases of mimicry by Lepidoptera, of Hymenoptera and Diptera. A plate of Agrotids and three of *Catocala* follow, and then five of life-histories of Algerian species worked out and drawn by Mr. H. Powell.

There are seven plates with 137 figures of species of *Syrichthus*, illustrating the important paper on the group, in this volume.

The photographs, some 59 in number, entitled "Exploration de Harold Powell en Algérie, 1911," are not the least interesting in the volume. The first dozen are from living insects, including *Tympanophora haroldi*. The remainder illustrate the country investigated, giving the habitats of various Lepidoptera, with the characteristic surroundings of the insects and their foodplants.

The volume increases our high appreciation of Mr. Powell as a scientific naturalist and observer, as an energetic explorer and collector, and not less as an artist and photographer, and shows what a marvellous amount of work he did in 1911. M. Oberthür is much to be congratulated in having two such accomplished assistants in his labours as Messieurs Powell and Culot.

[In Part II. of the current volume of the *Annales de la Société Entomologique de Belgique*, M. Paul Dognin gives several pages of notes on the various species discussed in the "Revision des Phalénites" in the above named volume of *Études*, and offering many corrections in the nomenclature of the figures given on the plates of M. Oberthür. His remarks are confined to the species of the S. American fauna he has referred to, which he has in his own collection.—H.J.T.]

Coleoptera in Sussex during 1912.

By HEREWARD C. DOLLMAN, F.E.S.

The neighbourhood of Ditchling during August and September repaid my collecting there moderately well. On August 30th I was very pleased to come across another example of *Bembidium quadripustulatum*, Dej., under a stone in a damp part of Spatham Lane sandpit. *Metabletus truncatellus*, L., a species I have on occasion found "strays" of at Ditchling in previous years, was found in some numbers among moss growing on an old flint wall (September 2nd). The second example of *Helophorus porculus*, Bedel., found in the district, was taken off a wall one very wet August day.

From some foul straw in a farm-yard, on August 20th, I sifted out a few *Oxypoda waterhousei*, Rye. This rare beetle I found not uncommonly in stack-refuse in April, 1911. I must thank Dr. David Sharp for "spotting" this little-known form for me. *Oxypoda annularis*, Sahlb., was secured in nice series by sifting dead beech leaves on September 11th, when one or two of the very uncommon *Choleva nigrita*, Er., were also tubed. September 19th gave me an interesting local record in *Quedius maurus*, Sahlb. (var. *fageti*, Thoms.), one of which species was found under the bark of a dying oak. *Quedius fulgidus*, F., recorded before as not uncommon in cow-sheds at

Ditchling, was found in great numbers among dirty, damp straw in a large shed on September 12th.

By beating clematis, elder, and other hedge-row plants, a number of *Lathridius angulatus*, Man., were knocked out, in company with many of its common congener, *L. lardarius*, De G. Assiduous work at a cut grass heap, accumulating week by week from the tennis-court, resulted in a few interesting captures. The genus *Monotoma* was represented by five species, three of which were quite common, *M. brevicollis*, Aubé., *M. picipes*, Herbst, and *M. longicollis*, Gyll., and two much more scarce, *M. spinicollis*, Aubé, and *M. quadricollis*, Aubé. A specimen or two of *Myrmecoxenus vaporariorum*, Guér., was also sifted from this grass heap. On September 15th I caught an *Aphodius porcus*, F., flying over the Clayton Hill Road, no others being found, however, in spite of much searching. Interesting as suggesting one of its food-plants, the capture of *Apion affine*, Kirby, in very small numbers on *Ononis* (September 19th) is worth noting.

From under the bark of a felled pine, riddled by the common *Tomicus* and *Hylastes*, a large number of *Hylastes opacus*, Er., could have been taken. This is rather interesting, as pines are very few and far between around Ditchling. A walk over to "West Wood," beyond Ditchling Common, on September 13th, led to the discovery of a *cossus*-infected oak tree, a large, but not a strong infection. *Epuraea decemguttata*, F., and *Cryptarcha strigata*, F., were the only interesting "goat-species" taken, but from moss off the trunk an *Anchomenus livens*, Gyll., and one *Scydmaenus pusillus*, Müll., were shaken out, while from out of the fairly solid wood a few larvæ of *Haplocnemus impressus*, Marsh, were dug out. My friend Mr. Cribb took a few imagines from this same tree earlier in the year. Later in the same day, I spotted another *cossus*-oak on Ditchling Common, and the best capture from this tree was a nice series of *Cryptarcha imperialis*, F. *Homalium planum*, Payk., also occurred to me here. A few walks over to the coast, to work around Brighton and Rottingdean, resulted in some local forms being taken. Under stones *Zabrus gibbus*, F., a series, *Licinus depressus*, Payk., five or six, *Amara consularis*, Duft., and a few *Syncalypta hirsuta*, Sharp, were found. Shaking out grass roots near the edge of the cliffs produced, amongst many other more common beetles, *Ocypus pedator*, Grav., *Silpha obscura*, L., in numbers, and a few *Opatrum*. September 3rd, my father and I went over to Balcombe Forest, principally after Lepidoptera. The day was not by any means without profit among the Coleoptera as well, however.

The most choice capture was a fine example of the blue form of *Byctiscus betuleti*, F., beaten from birch; the lateness of the date points to this being one of a second brood, a fact already noted in the life-history of *B. populi*.

Elmis volkmari, Panz., was found in great numbers on the lower surface of submerged stones and brick-bats in a quickly flowing stream; several often could be seen upon one stone. On the bank of the L. B. and S. C. Ry., just after Balcombe Tunnel, I tubed a few *Notiophilus*. On capture I did not worry about their specific identity, wanting any members of the genus to replace old specimens in my collection. On examination, all four of them turned out to be the rare *N. quadriguttatus*, Dej., the arrangement of the four punctures, except in one specimen, not symmetrically including a rectangle, the lower left puncture in three of the specimens being markedly lower than its corresponding fellow.

We gave some little time to working one or two *Formica rufa* nests, situated near the entrance of Balcombe Forest. I mention below all the myrmecophilous beetles seen, knowing that all localities and dates of such species are of particular interest to one of the editorial staff, even when the beetles concerned are not by any means "rare." *Oxypoda haemorrhoa*, Sahl., common, *Thiasophila angulata*, Er., very scarce, *Notothecta flavipes*, Grav., not uncommon, *N. anceps*, Er., one or two, *Quedius brevis*, Er., four or five, and *Leptacinus formicetorum*, Maerk., common, were the "regulars" present. One example of *Bryaxis fossulata*, Reich, presumably a stray, was also noticed.

Additional Notes from Ditchling for 1911.—(Pages 20-23 *ante*.)—Some of the more obscure captures of last year, having been submitted for verification to the various specialists in their groups, I now put on record *Homalata languida*, Er., one or two in thick moss from a small wood, April 15th. *Homalota parens*, Er., from moss round a small pond, August 30th. *Homalota pilicornis*, Thoms., in company with the latter, very rare. *Homalota exilis*, Er., a few of a large form of this species from under stones on April 12th. From a dead starling on September 22nd, I took a short series each of *Homalota puberula*, Sharp, and *H. oblita*, Er., also one specimen of a form apparently referable to *soror*, Kr. By sifting moss in the garden field, *H. villosula*, Kr., was taken sparingly in April.

One or two *Gabrius bishopi*, Sharp, were shaken out of cut reeds at Offham, near Lewes, on April 30th. On September 23rd, I found a small *Placusa* commonly under the sappy bark of an oak; this turns out to be *Placusa pumilio*, Grav. A single specimen of *Atomaria umbrina*, Gyll., was also found under this bark. Other species of *Atomaria* found during the year, worthy of noting down, were:—*nigriventris*, Steph., *nigripennis*, Payk., in cow sheds; *atra*, Herbst, rarely in moss, etc.; *fuscata*, Sch.; *gutta*, Steph., common round a small pond; *mesomelas*, Herbst, rare, in company with *gutta*; *fuscipes*, Gyll., a few by sweeping on the Downs; *pusilla*, Payk., very common in stack-refuse and moss; *berolinensis*, Kr., rare; *apicalis*, Er., not uncommon, and *versicolor*, Er., one from a rotten oak bough.—H. C. D.

SCIENTIFIC NOTES AND OBSERVATIONS.

A New European Butterfly.—Herr George C. Krüger, of Milan, contributes to *Societas Entomologica* for March 15th, an interesting note recording the occurrence in Spain of a Hesperid butterfly, which is new to the European list. The insect in question is *Panara borbonica* var. *holli*, Obth., and the writer tells us that in December, 1910, his father sent him, for the collection of Count Turati, a male specimen of a "Dickkopf," which was a reminder that he had collected a number of them more than twelve years previously, and had distributed them among the gentlemen who had participated in his first collecting journey, as "*Panara nostrodamus* var." He took the first examples of this beautiful golden-yellow befringed and dusted Hesperid, whose forewings in both sexes are ornamented with semi-transparent spots, in June and July, 1899, on the flower-beds of the railway station at Algeciras. Later on, in August and September, and in subsequent years, he saw them abundantly between the second and third railway bridges on the right bank of the Rio Miele. This river, which is only a short kilometre long, collects its waters in the cork woods of the Sierra de la Luna, the most southern of the Spanish mountains, and flows into the haven of Algeciras, in the bay of Gibraltar.

Monsieur Oberthür has determined Count Turati's specimen as being *Panara borbonica* var. *holli*, Obth., which he had previously described from Algerian specimens sent home by Captain E. Holl from the province of Hussein Dey, captured at the end of October. The variety seems to differ from the type which occurs in Madagascar, Bourbon, and Sierra Leone, by being smaller, and in the reduction in size of the three white points edged with black, on the underside of the hindwings. Monsieur Oberthür's notes on the subject will be found on pp. 363-5 of vol. iv. of *Études de Lépidoptérologie Comparée*, and there are two figures on Plate LX. in the next volume of the same work. Herr Krüger's Spanish record adds a very interesting species to our European butterfly fauna, and English entomologists who intend visiting the south of Spain during the coming season should be on the look-out for it.—A. E. Gibbs (F.E.S.), St. Albans, Herts.

Another new European Butterfly.—Dr. Chapman is still pursuing his investigations into the more obscure species of the *Lycaenidae*. In the *Trans. Ent. Soc. Lond.*, Part iv., page 662, he discusses "An unrecognised European *Lycaena*, identified as *Agriades thersites* (Boisd. MSS.) Cantener," illustrating his remarks by five plates. Almost from its first recognition this species has been confused with *Polyommatus icarus* ab. *icarinus*, which it both closely resembles and associates with on the same ground, but from which it is generically distinct in its genitalia. The species seems to be comparatively a southern one. So far the distribution is outlined only by the specimens which he, Dr. Chapman, has had in review. Savoy, Dauphiny and Provence in France; Piedmont, Piceno and Siena in Italy; Tragacete, Albarracin and Barcelona in Spain; Syria, Persia and Central Asia; Trelex, Ollon and Visp in the Rhone Valley; and two more northern localities Weimar and Saxony. In his researches Dr. Chapman has brought into notice an interesting work published in Paris in 1834, *Hist. Nat. des Lep. Rhop. ou Pap. diur. des depart. des Haut- et Bas-Rhin, de la Moselle, de la Meurthe et des Vosges*, Par L. P. Cantener, Avocat, ex-Prof. á l'école de Sorège. This book is well illustrated by a series of capital plates.—H.J.T.

A Gynandromorph of Parnassius delius.—Carl Hold figures and describes a striking gynandromorph of *P. delius* in the *Int. Ent. Zeit.* of March 22nd. It was captured sitting on the foodplant on July 10th, 1911, near the Naret Pass, in S. Tessin. While the two left wings are quite of the pure white of the male butterfly with only a few black markings, the right wings show the typical form of the female with much extended black markings, especially pronounced in the eyespots of the hindwings. The two wings on the right side are larger, the eyespots are larger and more distinct than those on the left side. The forewings possess the usual red costal spots on both sides, except that on the underside of the right wing is a second red spot, as is usual in the ♀. Also on the inner margin of the underside of the right hindwing is a large red spot, which is wholly wanting on the left. The abdomen is male.—H.J.T.

A Gynandromorph of Orgyia antiqua.—Karl Abrecht, of Saarbrücken, figures and describes a gynandromorph of *O. antiqua* in the *Ent. Zeit.*, of March 22nd, which was taken in a garden where the species is very abundant. It was sitting on the cocoon from which it had just emerged. The pupa case showed the gynandromorphism very distinctly. The left side is male and the right side female. The line of separation is very apparent, and exactly median down the body. The ♂ side of the abdomen is brown and the ♀ side gray, sharply separated in the middle. The ♂ legs, especially the front ones, are long and brown, the ♀ legs short and gray. The ♂ wings are imperfectly developed, probably owing to difficulty in emergence from the pupa. No examination of the genital organs has been made.—H.J.T.

NOTES ON COLLECTING, Etc.

The Past Season, 1912.—Mr. Baker-Sly states in the last month's number of the *Ent. Record* (p. 54) that *Anthrocera filipendulae* was common on Box Hill in the middle of last August. The species was extraordinarily rare on the North Downs near Wrotham. In the one locality on the Downs, which I visit with any frequency, it appeared to be non-existent. I was particularly desirous of finding it as I am attempting to hybridize Burnets.

Hydraecia nictitans has also been very rare near Tonbridge. I was wanting spirit material for dissection and only obtained one specimen. I could find no members of this genus in the Lake district during the first fortnight of September, the weather, however, was extremely unfavourable. One or two of my correspondents have noted the scarcity of the insect this last season. *Leucania lithargyria* was perhaps more common than usual near Tonbridge. *Cemiostoma laburnella* was extraordinarily rare again in the garden near Tonbridge, we have been particularly afflicted by this species in previous years. This August the one or two laburnum trees which I searched appeared to be rejoicing in complete immunity from the pest.—P. A. Buxton (F.E.S.), Trinity College, Cambridge.

Lycæna arion at Constantinople.—Count Michel Bukowky, Secretary to the Austro-Hungarian Embassy here, has shown me a remarkably large and fine female *L. arion*, which he took close to Therapia on the European side of the Bosphorus early in July 1912. The specimen, a light form, was the only one which he saw. I have not seen *L. arion* alive yet but hope to take it here. Meanwhile records of this species from the S. Eastern portion of its distribution area which does not seem to extend much, if at all further South than Mt. Olympus above Brusa, being few and far between, I have noted this capture with Count Bukowky's kind permission.—P. P. Graves (F.E.S.), Club de Constantinople. *February* 28*th*, 1913.

Vanessa io.—On March 5th I saw a very good example of *Vanessa io* in my garden sporting in the sun.—H. G. Gregory, Westleigh, Salisbury. *March* 8th, 1913.

Collecting Notes in 1912.—During July, 1912, I was staying at Rhosilli, a tiny village at the extremity of the Gower peninsula of Glamorganshire. The country round includes miles of cliff top, extensive moorland and sand-burrows, deep lanes and the great sandy stretch of Rhosilli Bay. The following list of beetles collected there may be of interest.

Cincindela maritima, common along a short stretch of the low sandy cliff of the bay, but not seen elsewhere; *Cychrus rostratus*; *Nebria complanata*, shaken from overhanging roots of rush on the cliff of the bay; *Chlaenius restitus*, *Amara tibialis*, *A. lucida*, *Harpalus neglectus* and *H. ignarus*, all on the sand dunes; *Amara bifrons*, *Calathus mollis* and *C. flavipes*, *Bembidium pallidipenne* and *B. quadriguttatum*, *Dromius meridionalis*; *Deronectes latus*, one taken from a shingly stream on the moor; *Agabus didymus*, *Ocypus ater*, common along the cliff-tops; *Philonthus lepidus*, one on the sand-burrows; *Stenus guttula* and *S. pallitarsis*, *Silpha tristis*, *Subcoccinella 24-punctata*, *Antherophagus pallens*, *Anomala frischi* common on the sand dunes; *Aegialia arenaria*, *Cteniopus sulphureus* (abundant); *Lagria hirta*, *Heliopathes gibbus*, *Salpingus aeratus*, *Apthona nonstriata*, *Otiorhynchus rugifrons*, *Philopedon geminatus*, *Hypera fasciculata* under *Erodium* on the sand-dunes; *Apion subulatum* and *A. aethiops*, *Alophus triguttatus*, *Coeliodes quercus*, *Ceuthorrhynchus litura*.

During September of this same year I was at Buttermere, in the lake district of Cumberland. *Carabus glabratus* occurred rather frequently, especially in the big ravine called Coledale; *C. catenulatus* was abundant and very variable, one black specimen taken; *C. arvensis* scarce. Other species taken were *Nebria gyllenhali*, *Pterostichus aethiops*, *Patrobus assimilis*, *Bembidium atro-caeruleum*, *Agabus arcticus*, abundant in a tarn at 1,700ft.; *Hydroporus longulus* and *H. septentrionalis*, *Staphylinus stercorarius*, *Quedius fulvicollis*, *Philonthus decorus*, *Othius laeviusculus*, *Acidota crenata*, *Lestera sharpi* and *L. sicula*, *Homalota eremita*, *Silpha nigrita* and *S. quadripunctata*, *Cryptohypnus riparius*. On the whole, beetles were rather few and far between, and even the commonest species were hardly more than locally common, with the exception of *Geotrupes sylvaticus* and *G. vernalis*, which were everywhere. Very little was found high on the mountains, but *Pterostichus madidus* occurred at 2,000ft., as did *Byrrhus pilula*. *Philonthus varians* was taken above 2,400ft., and *Carabus arvensis* at a little below that height. I may add that during this year I took *Lathrobium angustatum* at Coverack, in the Lizard Peninsula of Cornwall, in April; *Orsodacna lineola* and its var. *humeralis* together at Ruislip, April 28th, *Cassida vittata* at the Lizard in April, and *Ischnomera sanguinicollis* at Burnham Beeches on May 11th. Being a mere beginner I have to thank Mr. Donisthorpe and Dr. Nicholson for much kind help in naming my captures.—J. W. ALLEN (M.A., F.E.S.), 30, Blenheim Gardens, Cricklewood.

CURRENT NOTES AND SHORT NOTICES.

We hear with pleasure that the London Institution is not to be pulled down and that consequently the City of London Entomological and Natural History Society have returned to their old quarters in the historic building, which we understand has passed into the hands of the Government. The Society's *Transactions* (reviewed *ante* page 55) were issued to date we find, and it was quite an accident that the copy for review, forwarded in April, did not reach us until late in the year.

In the *Revue Mensuelle de la Soc. Ent. Namuroise* a new form of

Eumorpha elpenor is recorded as ab. *alboradiata.*—"Alis posticis superne alboradiatis."—In the hindwings the spaces between the nervures are rayed with white. This radiate marking is stated to be a rare form of variation in the *Sphingidae.* A small example of *Gonepteryx rhamni* measuring about 43mm. in expanse is named ab. *minor*, and for the form without the orange discoidal spot, which occurs occasionally, the name *obsoleta* is suggested.

The current parts of the *Verhand. k. k. zoo.-bot. Gesell. Wien* contain a comprehensive article on the Lepidopterous fauna of the Otztal, or Oetzthal, a valley running south from Otz, a station about mid-way between the Arlberg tunnel and Innsbruck, by Professor D. Moritz Kitt. For four successive years he spent his holidays there, lasting from the beginning of July to mid-September, and with the help of a few friends, who occasionally stayed with him, he has obtained records of no less than 118 species of butterflies besides a very large number of species of Macro-Lepidoptera Heterocera. He refers to the previous records of captures and observations in the same area, and adds geological, geographical, and other notes useful for any future visitor to this famous north Tyrol valley. A sketch map of his wanderings with elevations is included.

The Annual Address to the Entomological Society of London, by Rev. F. D. Morice, M.A., the President, was devoted to a detailed consideration of "Secondary Sexual Characters as exemplified in the Aculeate Hymenoptera of the European and Mediterranean areas," based upon his own personal examination generally of long series of specimens and of most species in nature. It is a distinct addition to our permanent entomological literature.

The ♂ of *Colias edusa*, with violet shimmer on the upperside of the hindwings, has now been named ab. ♂ *micans* by Hans Kiefer, *Ent. Rundschau* (*Insektenbörse*), March 22nd. It is an analogous aberration to the ab. *micans* of *C. myrmidone.*

A series of articles is appearing in *Fauna exotica* on the systematic use and advantage of the electric light for entomological purposes.

The genus *Parnassius* for some time past has occupied the attention of many entomologists, and one rarely takes up the usual weekly entomological magazines of the continent without finding at least one article devoted to this genus. Unfortunately, the new names which appear are multitudinous, and one can only fear that excessive duplication must be taking place.

Professor Dr. Rudow contributes an article on the Micro-lepidoptera of Upper Austria to the *Ent. Zeitschrift*, of March 15th. He states that there are no less that 1,282 species with 120 special races found in this region. Of these 171 are *Pyralidae;* 30 are *Pterophoridae;* 4 are *Orneodidae;* 330 are *Tortrices;* 49 are *Yponomeutidae;* 12 are *Glyphipterygidae;* 18 are *Plutellidae;* 212 are *Gelechiidae;* 186 are *Elachistidae;* 91 are *Gracilariidae:* 23 are *Lyonetiidae:* 60 are *Nepticulidae;* 5 are *Talaeporiidae;* 80 are *Tineidae:* 6 are *Eriocraniidae*, and 5 are *Micropterygidae.*

In the *Int. Ent. Zeit.*, for March 15th, is given a plate with figures of two very interesting hybrids from *Deilephila lineata* var. *livornica* ♂ and *D. euphorbiae* ♀, with figures of the parents for reference. Of this brood there were 21 perfect pupæ, seven males and fourteen females. Three males emerged in the autumn of 1912 and two male pupæ died;

the rest, two males and fourteen females, came out in the present year.

To the *Entomological News* Mr. G. T. Bethune-Baker is contributing an article on *Everes comyntas* and *E. amyntula*. It will be remembered that in Vol. X. of *British Lepidoptera*, the late J. W. Tutt accepted both the above forms as races of the Palæarctic *Everes argiades*, with a certain amount of reservation. To this decision he was mainly led by the work of Mr. Bethune-Baker and Dr. Chapman. Setting out with this view our author has now come to an exactly opposite conclusion, *viz.*, that *E. comyntas* is a distinct species. The possession of a series of some 600 specimens, the examination of several hundred more, many preparations of the genitalia, the hearty co-operation and opinion of Dr. Chapman, and the evidence of many of the principal American entomologists, some of whom have bred the species brood after brood, have led Mr. Bethune-Baker to this result.

To those interested in the study of Mimicry an article in the March number of the *Ent. News* by J. R. Haskin, "The Danaine Species of N. America and their Mimics," will be very interesting. He attempts to apply the Batesian Theory to *Danais strigosa*, *D. berenice*, and *D. plexippus*, and their mimics *Limenitis obsoleta*, *L. floridensis*, and *Anosia plexippus*, adding his own field observations on these insects.

In the current volume of *Entomologische Mitteilungen*, the official organ of the "Deutsches Entomologisches Museum," a series of articles are appearing by Fritz Wagner on the lepidopterous fauna of the Ili district of Russian Central Asia. Portions of this area have already been investigated by Alphéraky and by Frederichsen. Several figures of the more striking forms have appeared, together with a plate of 20 forms of *Parnassius actius* all taken on the same ground.

In the *Scottish Naturalist* for February, Mr. A. E. J. Carter records two Diptera of the genus *Tachydromia* as new to the British List. *Lachydromia annulipes* occurred at Aberlady in June, 1904, and is a widely distributed European species of quite distinctive characters. *T. major* was taken at Loch Tay in July, 1904, and is the largest species of the genus. It comes nearest to *T. ecalceata*.

A very complete and valuable story and life-history of that beautiful and curiously rare *Noctua*, *Oxytrypia orbiculosa*, Esp., appears in the "Annals of The National Hungarian Museum" for 1912—from the pen of Dr. Antal Schmidt. The species was described by Esper from a single male example, taken at Szeged, probably in 1797 or 1798, and now in the Hungarian National Collection. The second example was taken at Városliget in 1847. Since that date *O. orbiculosa* has been found in various small localities near Buda Pest, but never until quite recently in any numbers. In consequence of the rarity and value of the specimens, extraordinary efforts were made to keep the localities secret, and one even hears of collectors going on the ground armed with a revolver, and using this weapon upon intruders! The imago appears in September and October. The males fly with a swift undulating flight in small clearings in woods in the morning sun in search of the female, which is usually to be found at rest. The ova are dropped in the sand, loose, in the neighbourhood of the foodplant *Iris pumila*, and pass the winter in that stage. The larvæ emerge in April, they feed, chiefly by night, on the leaves and rhizome of *Iris pumila*. The article is illustrated by an excellent coloured plate showing the different life-stages and the working of the larva in the foodplant.

SOCIETIES.

The Entomological Society of London.—*November 6th*, 1912.—Dr. Emile Frey-Gessner, La Roseraie, Genève, Switzerland, was elected to the Honorary Fellowship rendered vacant by the death of Prof. Ganglbauer. Messrs. G. C. Bodkin, Govt. Entomologist, George Town, British Guiana; C. Bowring, Acting Commissioner of Customs, Wenchow, China; F. L. Davis, J.P., M.R.C.S. (Eng.), L.R.C.P. (Lond.), Belize, British Honduras; Dr. Dewitz, Devant-les-Ponts, Metz, Lorraine; H. M. Hallett, 13, Earl Road, Penarth, Glamorgan; A. D. Imms, D.Sc., B.A., F.L.S., Forest Zoologist to the Govt. of India, Forest Research Institute, Dehra Dun, U.P., India; N. Jardine, 2, Castle Street, Ashford, Kent; H. King, Govt. Entomologist, Gordon College, Khartoum, Sudan; Jal P. Mullan, M.A., Asst. Professor of Biology, St. Xavier's College, Chunam Kiln Road, Grant Road, Bombay, India; E. J. Paterson, Fairholme, Crowborough; W. Rait-Smith, 86, Gladstone Street, Abertillery, Monmouthshire; and Dr. A. Seitz, 59, Bismarckstrasse, Darmstadt, Germany, were elected Fellows of the Society. Brenthis pales, var. isis, ab. napaea, and ab. suffusa.—The Rev. G. Wheeler exhibited on behalf of the Rev. F. E. Lowe a series of *Brenthis pales* taken in the Heuthal, Bernina Pass, on June 24th, 27th and 28th, 1912. Some were of the var. *isis* and some of the ♀s of the ab. *napaea*, but the most remarkable were very pronounced examples of the ab. *suffusa*, Wh., both ♂ and ♀, some of the latter being almost completely black. Blue Females of Polyommatus icarus.—Mr. Wheeler also exhibited on behalf of Mr. R. M. Prideaux a series of unusually blue ♀s of *Polyommatus icarus*, taken in the spring of this year in the Westerham district. Melitaea aurinia.—Mr. L. W. Newman exhibited a long and constant series of *M. aurinia*, bred from two batches of ova laid by North Cornwall ♀s; and on behalf of Mr. G. B. Oliver, a picked and varied series, bred by the latter also from North Cornwall larvæ. A myrmecophilous African Lycaenid.—Dr. W. A. Lamborn exhibited two larvæ and two bred imagines with corresponding pupa-cases, of the Lycaenid butterfly *Euliphyra mirifica*, Holl. The larvæ were found in a nest of the ant *Oecophylla smaragdina* var. *longinoda*. The Spherical Structures on Cocoons of the Tineid Moth Epicephala chalybacma, Meyr.—Prof. Poulton read a letter, describing the production of these structures, written May 27th, 1912, from Peradeniya, Ceylon, by Mr. E. E. Green, and exhibited the cocoons referred to therein. The West African Agaristid moth Messaga monteironis, Butler, a mimic of the Hesperid Pyrrhochalcia iphis, Drury.—Mr. J. A. de Gaye, who was present as a visitor, showed examples of the above-named model and mimic captured by him on the same day at the same plant. A myrmecophilous Coleopteron.—Mr. Donisthorpe exhibited a specimen of *Thorictus foreli* var. *bonnairei*, Wasm., a small beetle, fastened on to the antenna of an ant, *Myrmecocystus bicolor*, F. Pierine Butterflies and their Scent-Scales.—Dr. F. A. Dixey made some remarks on the Pierine genus *Pinacopteryx*, illustrating them by exhibiting male and female specimens of most of the species, side by side with which were shown drawings made to scale of the plumules characteristic of each form. Protective Resemblance.—Mr. A. Bacot exhibited an Acridiine Orthopteron from the Benguella Plateau, which bore a very perfect resemblance to the scorched grass stems, on one of which it was resting; also specimens of the Dipteron *Glossina palpalis*, var. *wellmani*, Austen, from Catumbella River. Gigantic Larvæ.—Mr. Eltringham exhibited two specimens of an unusually large Lasiocampid larva which had been presented to the Hope Department by Mr. C. A. Foster, who took them in Sierra Leone. Each larva was about seven inches in length. Professor Poulton suggested that the larvæ might perhaps be *Gonometa subfascia*, Walk., or *G. regia*, Auriv. The following papers were read:—"On New Species of Fossorial Hymenoptera from S. Africa, chiefly *Elidinae*," by Rowland E. Turner, F.E.S., and "The Life-History of *Pseudacraea eurytus hobleyi*, Neave," by G. H. D. Carpenter, B.A., B.M., B.Ch., F.E.S. A paper on "Some Luminous Coleoptera from Ceylon," by E. Ernest Green, F.E.S., was read by Mr. C. J. Gahan. *November* 20*th*, 1912.—New Fellows.—Miss Margery H. Briggs, B.Sc., 7, Winterstoke Gardens, Mill Hill, N.W.; Messrs. Edward Ballard, Zomba, Nyassaland; George Trevor Lyle, Bank House, Brockenhurst; Rev. J. W. Metcalfe, The Vicarage, Ottery St. Mary; Kurt, Baron Rosen, Zoologische Staatssammlung, Munich. West African Rhopalocera and Hymenoptera.—Dr. W. A. Lamborn exhibited (1) a small company of the Nymphaline butterfly *Euphaedra ravola*, Hew.; (2) Two bred families of the Pierine butterfly, *Leuceronia argia*, Fabr., with the ♀ parent in each case. A Scarce Hemipteron.—Mr. E. C. Bedwell exhibited specimens of *Lasiosomus enervis*, H.S., one of the rarest of the British *Lygaeidae*. Mantid Oothecae.—Mr. O. E. Janson exhibited specimens of a remarkable Mantid ootheca from Delagoa Bay. Aberrations of Colias edusa.—Mr. E. C. Joy exhibited two aberrant specimens of *C. edusa*, bred from Folkestone in October last. Remarkable Larval Nests. Dr. K. Jordan exhibited two nests of *Eucheira socialis* recently received from Western Mexico. The caterpillars of this Pierine butterfly live gregariously in an opaque nest of silk, which has an aperture at the lower end. Pupation takes place in the cavity of the nest, the pupæ being suspended by the tail, as in the case of *Nymphalidae*. The following Papers were read:—"Notes on Various Central American *Coleoptera*, with Descriptions of New Genera and Species," by G. C. Champion, A.L.S., F.Z.S., F.E.S.; "The Butterflies of the White Nile, a Study in Geographical Distribution," by G. B. Longstaff, M.A., M.D., F.E.S. A considerable discussion took place on the subject of Dr. Longstaff's paper.

REVIEWS AND NOTICES OF BOOKS.

Lepidopterorum Catalogus, Part x. Tortricidæ. E. Meyrick. W. Junk, Berlin. Price, Mark 8.10.—Some time ago the above-named part of the "Catalogus" came to hand, and as we were then just commencing to overhaul our *Tortrices* it was expected to be very useful. At the moment the genus *Peronea* was before us, and the remembrance of an article in the pages of this magazine some years ago, giving an exhaustive account of the various named forms of *Peronea cristana*, by the late J. A. Clark (and J. W. Tutt), came to us. What was the reference? The "Catalogus" should tell us. On turning to the genus *Peronea*, page 59, to our utter astonishment we found that Curtis was the only author credited as having discussed this genus. Surely Barrett, Stainton, Wilkinson, Wood, Herrich-Schäffer, Heinemann, Duponchel, Treitsche, Stephens, etc., etc., have treated of this genus as a whole, and surely many more or less comprehensive notes on it have appeared in magazine literature from time to time, *e.g.*, Weston, Webb (*Ent.*). On turning to *P. cristana*, p. 66, we still found no help, for there was no reference to the article we needed and we had to wade through the indexes of the back volumes of the "*Ent. Record*," before we met with the article we wanted in vol. xiii., page 227 *et seq.* Here we found that 65 forms had received names at one time or another, and that full references were given with copies of the original descriptions of each form. Going back to the "Catalogus" we found only 19 named forms referred to, the rest were utterly ignored. (South's "Entomologist" List published as far back as 1884 gives 30 named forms for Great Britain alone). We can only say how disgusted we were at the ignorant, or shall we say negligent, incompleteness of the List as we have tested it. Surely it was absolutely necessary in an important work of this nature, to give every available reference likely to be of use to the future student, at least every author and every name, which has been at anytime used as a synonym or in any way connected with the genus or species, should be included, even if riper experience and deeper knowledge have shown error to have crept in. Turning to page 3 to see the list of authors, treating of the *Tortricidae* as a whole, we were again grievously disappointed to find *not a single reference.* After what we had been led to expect from the splendid example set by L. B. Prout in his section of the "Catalogus," the *Geometridae*, where he gives no less than *sixteen pages of references* to the works of those who have dealt with the section more or less at length, we can only wish that the "*Tortricidæ*" section had never been issued. We did expect that at any rate our English contributions to this great work would be much above the general average completeness attained in the various sections and not far and away below as this one is. Let us hope that the Editors will in future vigorously insist against the acceptance of any further contributions unless a very high standard of completeness be both attempted and attained. The part before us will have to be done again before it can be of use to any one who takes up really serious and thorough research work in the *Tortricidae.* Further investigation shows us that only a limited number of works have been consulted for references and that a large number of important contributions are utterly ignored. (*E.g.*, *hyerana* page 11. No reference to Chapman's valuable contributions to our knowledge of this species.) It would be much better to include all possible references, even if some were of doubtful utility, rather than to make a selection, which selection, in the nature of things, can only be satisfactory to the man who makes it. References are the tools with which a student works, and the greater ease and saving of time in this mechanical and routine work, the more time, thought and energy are available, and the better and more thorough the scientific results attained. The work, as regards get-up, printing, etc., as it would be coming from the firm of W. Junk, of Berlin, is quite admirable.—H.J.T.

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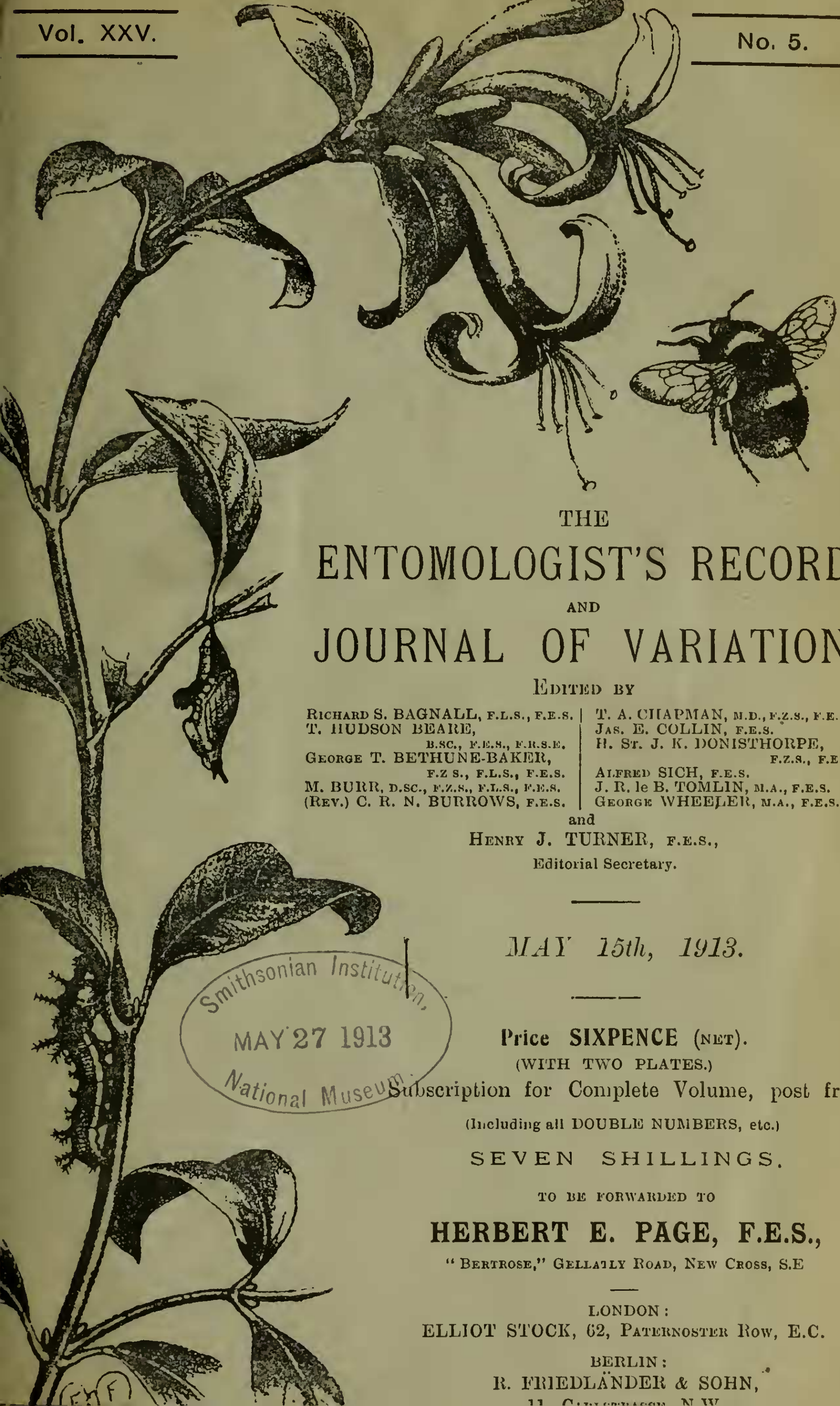

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The Coloration Problem.

By W. PARKINSON CURTIS, F.E.S.

(*Continued from page 102.*)

Although it is not easy to say what is the object of attack, the action of attacking an insect is unmistakable, because of the sudden alteration of tactics on the part of the bird, the sudden pull up and then the quick twists and turns. It is a matter of surprise to us to find what an immense number of birds like insect diet. Besides the regular insectivores, *viz.*, the *Sylviidae* (Warblers), *Cypselidae* (Swifts), *Caprimulgidae* (Night-jars) and Swallows and Martins (*Hirundinidae*), we have now noticed the major portion of the *Passeriformes*, the Gulls *Larus canus* and *L. ridibundus*, the *Strigidae* (Owls) and the common Heron (*Ardea cinerea*). This last, unlikely bird, we noticed catch an insect on the wing in July, 1912, in the Cam Valley. Reputedly graminivorous birds dearly love insect food, and we notice that *Sturna vulgaris* (the Starling) and *Fringilla coelebs* (the Chaffinch) make a practice of frequenting tree tops in the late afternoon in order to catch those insects which bask in the last rays of the dropping sun. It may be noted in this connection that Pierids, Lycaenids, Satyrids and Nymphalids in the late afternoon seek the upper parts of trees to sun themselves. What is the logical conclusions to draw from these observations? To my mind one only, *viz.*, that insects, including Lepidoptera, form a staple article of diet and are procured in the manner one would expect from the habits of the bird. It is of little use quoting the ornithologists on this subject, Mr. Marshall has already pointed that out. Lieut.-Col. Manders has (1911 *Trans. Zool. Soc. Lond.*, page 696 *et seq.*), quoted their opinions on this point, and they are, like their works, so vague as to be almost useless.

I venture to suggest to Lieut.-Col. Manders, that his remarks (*loc. cit.*, page 711), with regard to Mr. Marshall's quotations, might pass muster as a piece of smart pleading in a defence, where counsel had a bad case to support, but that it leads nowhere in a matter of this nature. None of the disputants have a case to make good, it is only a question what is really the truth in the matter. Mr. Marshall was quoting from ornithological works, and not giving his own observations, nor observations directed to this particular end, and an admission on the part of an ornithologist was valuable, since it meant that the attacks were sufficient to force themselves upon the notice of an ornithologist. To argue, therefore, that he himself is entitled to assume that the mere fact, that an ornithologist omits mention of feeding upon lepidopterous imagines and only refers to *Grasshoppers* and various *other* kind of *coleopterous* insects! (the Italics this time are mine), means that no lepidopterous imagines are attacked, is an entirely unwarranted assumption. The fact is that the ornithologists usually note that a bird will or will not eat an insect (usually according to my experience when they say not they are wrong). But if any insects be eaten they do not remark whether the food be a Chalcid fly or *Attacus atlas*, because, more often than not, they cannot tell one from the other. The ornithologist who laboriously mounts the contents of his birds' stomachs and then as laboriously identifies the mounts is still a rarity.

May 15th, 1913.

Lieut.-Col. Manders does a very great deal less than justice to the evidence produced by Mr. G. A. K. Marshall, because first he says "all available evidence." It was all the evidence that Mr. Marshall's great industry collected in a very short time, and it was a pretty strong collection, but there were omissions to my knowledge. Secondly, he entirely ignores the Garden Warblers (*Sylvia simplex*, Becht.) that actually fed their young on *Pieris rapae.* Further, why he should assume "that if any bird fed, etc., such would be known," I do not quite know, and he might refer to Mr. Marshall's remark on the Kestrel, which was originally a casual observation of mine, and once pointed out, has been noticed by other people at various different localities, and has been repeatedly confirmed by myself all along the Dorset coast. Yet no one had remarked it before, and it must have been going on for untold centuries. I refer Lieut.-Col. Manders, also to Folsom, *Entomology, with reference to its Bionomic and Economic Aspects*, page 284, *et seq*. (pub. 1906).

I do not think myself that it matters whether we ascertain how much protection be afforded by cryptic coloration. No one believes (or ought to believe) that either styles of coloration secure absolute immunity, a comparatively qualified protection will call into play just those forces which the believers in the theories consider to have been called into play. I cannot follow Lieut.-Col. Manders into the jungle, nor can I pit twenty years of mature experience against his twenty years, since my naturalistic leanings only became noticeable a little longer ago than that, but though it may seem a matter of chance which animal comes to grief, the "seeming" is probably quite superficial. It may well be that the two tigers, acting in concert, would not get as good a chance of even coming across the bull-bison with the keener hearing and the keener scent. It may seem a lottery, but even lotteries conform to the law of averages. I cannot admit the cogency of the argument that the capture of an odd specimen here and there, etc., can have little or no effect. How many people observe these attacks, how many record them? Few of the former, still fewer of the latter, yet one may be quite sure that, what the bird is bold enough to do before one's face occasionally, it is likely to do much more often behind one's back, and one may also be sure that the entire bird population over the entire area of their residence are doing exactly the same thing all the time, and the cumulative effect must be very great. Remember we do not see a very small decimal per cent. of the actual slaughter, and, with the best will in the world, we can only observe a very small decimal per cent. of the birds, over a still smaller fraction of their area of residence.

I agree that to find birds which systematically prey or prove systematic preying upon Lepidoptera by an overwhelming weight of evidence, would be evidence that would close the mouth of the caviller once and for all, but I likewise agree that to find such a bird or birds is a difficult and laborious task, and after twenty years of birds and their funny little ways and curious individual likes and dislikes, I should say a well-nigh impossible task. The best way to solve the difficulty is to procure the stomachs of insectivorous birds, mount the contents, however fragmentary, and elucidate them as best one can. Mr. Marshall has pointed out the difficulty of identifying parts of lepidopterous insects (1908, *Trans. Ent. Soc. Lond.*, page 138), but the secondary genital armatures of Lepidoptera are much better known now than they were, so that it should not be an entirely impossible thing to get an approach to accuracy. (The genitalia, eyes, elytra, and other hard chitinous parts of insects seem to make up the bulk of the excreta of insectivorous birds.)

There is another method which might produce results:—Sit and watch a nest day in and day out, let numberless others do the same, and if you find caterpillars only are brought, change your nest, because one individual will specialise on a particular caterpillar or caterpillars. For example, my brother last year was busy for a long time watching a pair of Willow-wrens (*P. trochilus* var. *eversmanni*) feeding young. They brought almost exclusively *Taeniocampa cruda* and *T. stabilis*. I noticed *Parus caeruleus* (the Blue Tit) bringing larvæ to a nest, and so far as I could see they seemed to be entirely *Cheimatobia brumata* and *Oporabia dilutata*, with a very occasional *Hybernia defoliaria*. On the other hand a Chiff Chaff (*Phylloscopus rufus*), which my brother watched, seemed to have a great partiality for the brown *Hybernia* larvæ. Therefore you want an individual that hunts for imagines, and not only a species that does so. Mr. Colthrup doubts if birds look for wings at all, but rather the body. I once again disagree. Mr. Colthrup seems to give his birds credit for a very small amount of intelligence. Will he say that *Haematopus ostrilegus* (the Oyster-catcher), *Tadorna cornuta* (the Shelduck), and *Larus argentatus* (the Herring-gull) look for oysters, cockles, and butterfish ready shelled. Is it not the fact that they look for the shells and prize them open or drop them on a stone to break them? Does *Coccothraustes coccothraustes* (the Hawfinch) look for cherrystone kernels and single peas? Does he not rather look for cherries and peapods, knowing full well by experience that inside is the food he seeks? Cannot the insectivorous birds be allowed credit for sufficient deductive faculty to enable them to deduce presence of bodies from presence of wings? Dr. A. G. Butler (*loc. cit.*) rightly comments that man is very given to under-estimating the intelligence of the lower creation. (I do not wish to enter into the thorny problem of whether a particular action is a blind response to a stimulus, or a carefully reasoned out line of action, as for the purpose of these theories it does not matter.) A further reason is that later researches would seem to show that a very large portion, if not all, of the complicated actions of man are very much the same kind of responses to stimuli. (See Prof. Poulton's "Darwin and Bergson on the Interpretation of Evolution," *Bedrock*, No. 1, April, 1912, pp. 50 and 51).

As to *Gnophos obscuraria*, if in a secure retreat it is only dislodged with much beating. *G. obscuraria* much prefers a rabbit hole to rest in to anything else, and it requires some hefty thumps on the ground outside to induce it to rush into the waiting net, and it does not, according to my experience, display that nervousness Mr. Colthrup mentions.

Now the big Boarmiids, whose coloration is cryptic to a degree, and whose attitudes of rest seem specially adapted to render them still less conspicuous, are very nervous, especially of sudden movement or passing shadows, which rather supports the view that the perfection of colouring is due to stringent weeding out. My experience is limited to *Boarmia roboraria*, *B. consortaria*, *B. gemmaria*. *B.*

repandata and *B. cinctaria*. The first and last are the most nervous. Again is Mr. Colthrup sure that everything in nature has a use? What about the vermiform appendix or a pig's tail? It is probable that every natural attribute has had, has now, or will have a utility to its possessor, but whether or not a particular attribute is now at this present time useful, is entirely a question of fact. Mr. Colthrup's argument takes no notice of vestigial organs. *Lobophora carpinata*'s green bloom may have been useful once, it may merely be an atavistic character (it is found in other members of the genus when fresh) not sufficiently harmful to be worth eliminating, it may merely be an extraneous chemical condition having no bearing on the survival of the insect, and, moreover, the strong probability is that copulation and oviposition are completed before the green has faded out. *L. carpinata* does not rest exclusively on birch, and if it did, old birches are nearly always clothed with a pale green lichen, so that the colour would *pro tempore* be useful. I think fences may be taken into consideration, they are very like weather broken boughs of trees and dead stumps.

In Lieut.-Col. Mander's more extended remarks in (1911) *Proc. Zool. Soc. Lond.*, page 696, [which is fittingly followed by Mr. R. J. Pocock's experiments on page 809]*, I am met by the difficulty that Lieut.-Col. Mander's arguments are tropical and my experience is English, and only a very small part of England at that. Judged alone the position of affairs in Bourbon and Mauritius, to which Lieut.-Col. Manders calls attention, seems to present a serious difficulty, but any synaposematic combinations there existing must be brought under the general application of the theories, and the existence of the conditions, apparently inimical to the application unquestionably would no doubt be explicable, were we sufficiently informed, which we are not at present. I cannot pretend to be sufficiently equipped to deal effectively with special cases of this kind, in regard to which I have no first-hand knowledge, but two things struck me. Lieut.-Col. Manders dismisses several of the birds as too small to be possible causes. I believe this to be a fallacy. I do not from my own experience believe that size of insects matters much to a bird if only its beak be strong enough to tear the insect to pieces. Of course a bird with an exceedingly long slender bill, like some Humming-birds, cannot tackle an insect, unless it be a minute one, but subject to that it is very unsafe to draw inferences from relative size. Secondly, absence of material departure from a pattern, figured as little time ago as 1833, not a century, means little when one considers that heredity would tend to keep the species true to type, in the absence of any force tending to cause a departure, and it may well be that this particular synaposematic combination (if such it be) was the product of forces at work long ago, and for such a long time that the facies now existing has become firmly established. It is interesting to note that the Mauritius Kestrel, *Cerchneis punctata*, seems to have much the same habits as our own bird, and likewise that the remark on the *Fringillidae* not being hunters of insects is contrary to my experience of the *Fringillidae* in England.

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* There is a kind of poetical justice about the juxta-position of these two papers, which, as an ardent advocate of the theories, appeals to me.

Lieut.-Col. Manders, by his temperature experiments on *Limnas chrysippus* and *Hypolimnas misippus*, has endeavoured to do what most opponents have not attempted, or when attempting have failed, *viz.*, to furnish an explanation of the marvellous likeness subsisting between presumed model and presumed mimic, and after a careful perusal of his paper as published (1912, *Trans. Ent. Soc. Lond.*, page 445), I am bound to say I think he too has failed. Had he succeeded in demonstrating that temperature and (or) moisture had caused the remarkable similarity of the Danaine and Nymphaline, then indeed, as Prof. Poulton remarked at the time, the major part of the theories would have been so shaken that the residue would hardly have been worth propping up. (Prof. Poulton *in lit.*, October 11th, 1912, informs me that this is how his remark, made in discussion after Lieut.-Col. Manders' paper, should have been understood, and not as some of those present believed and indeed informed me as denoting that Prof. Poulton thought Lieut.-Col. Manders had succeeded in establishing his point or in damaging the theories.)

That moisture and heat do not affect coloration I do not attempt to contend, the rule apparently being that island races are darker than races from the adjacent continents.

(*To be continued.*)

Lepidoptera in the Wye Valley during 1912.

By J. F. BIRD.

(*Concluded from page* 89.)

July 2nd.—*Caradrina alsines.*

July 3rd.—*Nola cucullatella*, *Agrotis segetum*, *Leucania conigera*, and *Ligdia adustata* (perhaps the first appearance of the second brood).

July 4th.—*Lomaspilis marginata*, *Acidalia bisetata*, *Timandra amata* (*amataria*) and *Amoebe viridaria* (very worn).

July 5th.—*Xylophasia monoglypha.*

July 6th.—*Aglais urticae* (first brood), *Aphantopus hyperantus*, *Thyatira batis*, *Caradrina quadripunctata*, *Hemithaea aestivaria*, *Cidaria populata* (a new record for me in St. Briavels) and *Chesias obliquaria* (also bred on March 18th from a Tintern larva).

July 7th.—*Zonosoma annulata.*

July 8th.—*Cidaria picata.* *C. prunata.*—A few netted at dusk and also bred from larvæ (Tintern and St. Briavels).

July 10th.—*Coenonympha pamphilus* (second brood), *Notodonta dromedarius*, ♀ (bred), *Triphaena orbona* (bred), *Calymnia affinis* (Tintern, bred from larvæ off wych-elm) and *Cidaria pyraliata.*

July 11th.—*Cosmotriche potatoria* (bred).

July 12th.—*Polyommatus icarus* (second brood).

July 13th.—*Plusia moneta*, ♀.—Netted at dusk, as it was flying over bramble-blossom at the edge of a wood.

July 14th.—*Polygonia c-album.*—This, the summer brood, lasted up to September 15th. *Leiocampa dictaeoides.*—One bred from a larva obtained in 1910, and had therefore passed through two winters in the pupal stage. *Melanippe unangulata.*

July 15th.—*Pieris napi* (second brood). *Chattendenia w-album.*—On several consecutive days a few ♂ s paid my orchard a visit and fought each other for a favourite perch on the leaves of one particular apple-tree. Although this species occurs commonly on the Monmouthshire side of the valley, this is the first year I have met with it in Gloucestershire. *Adopaea linea*, *Nudaria mundana*. *Cleoceris viminalis*.—I also bred a few of this variable species from larvæ off sallow, the first emerging on June 28th. *Miana bicoloria* and *Eupithecia tenuiata*.

July 16th.—*Dryas paphia*.—Rather common in my orchard. I netted a rather curious ♂, with the apex of the forewings devoid of spots. *Anthrocera trifolii*. *Lithosia lurideola*.—I kept two larvæ, one found on a stone wall, and the other on the trunk of a *Cedrus deodara*. By feeding them on the young shoots of sallow, I managed, for the first time, to rear the perfect insect. *Bryophila perla*, *Abraxas sylvata*, *A. grossulariata* and *Coremia didymata*.

July 17th.—*Malacosoma neustria*.—The larvæ were common in the hedges; the first season we have found them so since we have collected in this district. *Noctua augur*, *Zanclognatha tarsipennalis* and *Eupithecia coronata*.

July 18th.—*Bithys quercûs*.—The larvæ were common in May, and I bred a nice series of this butterfly, the first emerging on July 1st. Two I bred are worth noting: (i) A ♂ with underside of forewings suffused with orange over one-quarter its area from the inner angle. (ii) Another ♂, the markings on the underside unusually dark and conspicuous, especially the discal lunules. Although the pupæ of this species are not fastened in any way to their cocoons (!) I fancy the larvæ may very occasionally attempt to pupate on the tree. I, at any rate, found a larva, evidently full-fed, resting in a small chamber formed of web and fragments of leaf, etc., spun round the leaf and flower stalks at the end of an oak twig. Being interested, I did not disturb it, but left it alone for further observation. During the following few days I looked at it occasionally, and once or twice inspected it after dark with a lamp. It never moved, but gradually altered in colour in the way this larva does before pupating. One morning I found the little cell empty, and no sign of the larva; either it had been picked out by some insectivorous bird, or else it had, as I believe, pupated, and not being attached had fallen to the ground. Considering the abundance of the larvæ during the spring, I was surprised not to see more than one example of the butterfly on the wing during the summer. *Vanessa io* (fresh brood), *Tephrosia bistortata* (2nd brood) and *Acidalia scutulata*.

July 19th.—*Calymnia trapezina*.

July 20th.—*Hydroecia nictitans*, *Crocallis elinguaria* and *Zonosoma porata*.

July 21st.—*Cerigo matura*.

July 22nd.—*Amphipyra tragopogonis*, *A. pyramidea*. *Plusia gamma*.—The fresh brood now began to appear. The latest record for this species was December 7th, at Tintern.

July 23rd.—*Leucania lithargyria* (very worn) and *Eubolia limitata*.

July 24th.—*Pieris brassicae*.—The larvæ were found feeding on the seed-vessels and leaves of *Hesperis matronalis*. At least two of them pupated on the small upper leaves of some neighbouring perennial sunflowers, attaching themselves to the upperside along the midrib.

Noctua baja, *Apamea oculea*, and *Leucania pallens*. There is plenty of ragwort to be found here, but I have never found it particularly attractive in this district until I tried, on this date, the experiment of treacling the blossom. It was quite the stickiest job I have ever tackled! however, it proved successful, but I was disappointed that only common insects turned up at the feast I provided for them during the next three or four weeks. Amongst the visitors were:—*Noctua plecta*, *N. baja*, *Leucania pallens*, *L. conigera* (in swarms), *Hydroecia nictitans*, *H. micacea*, *Amoebe viridaria*, *Eupithecia tenuiata*, etc.

July 25th.—*Pararge aegeria* (second brood) and *Noctua plecta* (second brood).

July 26th.—*Celastrina argiolus* (second brood).—It was curious, considering the abundance of this species in the spring, that the summer brood was not at all plentiful. The latest date on which I saw this butterfly was September 15th. *Gnophos obscurata*.

August 3rd.—*Minoa murinata* (second brood).—I *think* I saw one of these little day-fliers on this date. However, I met with a fresh-looking specimen at rest on a leaf in a hedge on August 16th which I am sure of. I also fancy a small, drab-coloured moth I saw flying in the sunshine as late as September 15th was also this species.

August 5th.—*Pieris rapae* (second brood).

August 7th.—*Eupithecia pumilata* (second brood).

August 8th.—*Rumicia phlaeas* (second brood), *Pyrameis cardui* (new brood). *Pararge megaera* (second brood).—Latest record, September 17th.

August 9th.—*Noctua xanthographa*, *Luperina testacea* (Tintern) and *Cidaria silaceata* (second brood).

August 11th.—*Triphosa dubitata* (fresh brood) and *Anaitis plagiata* (2nd brood).

August 12th.—*Emmelesia blandiata*.

August 13th.—*Hydroecia micacea*.—Latest record September 16th.

August 19th.—*Hepialus sylvinus*.

August 20th.—*Luperina cespitis* (Tintern).—The ♂s were not uncommon at light on the Gloucestershire side of the valley.

August 25th.—*Noctua rubi* (second brood, Tintern) and *N. umbrosa*.

August 27th.—*Gonoptera libatrix* (also bred, August 10th).

August 31st.—*Epineuronia popularis*.—The ♂s common at light.

September 1st.—*Hadena protea* (bred).—I obtained several larvæ off oak during May.

September 3rd.—*Polia chi*.—Also bred on August 16th.

September 5th.—*Melanippe subtristata* (second brood, Tintern).

September 11th.—*Amathes pistacina* (bred, Tintern) and *Eupithecia subfulvata*.

September 13th.—*Gonepteryx rhamni*, *Pararge aegeria* (third brood), *Cilix glaucata* (second brood) and *Noctua glareosa*.

September 14th.—*Xanthorhoë* (*Melanippe*) *unangulata* (second brood) and *Cidaria truncata* (second brood).

September 15th.—*Pyrameis atalanta*.—I bred one on August 3rd from a pupa found in spun up nettle leaves.

September 18th.—*Cidaria immanata* (very worn, the only specimen seen) and *Asphalia diluta*.

September 19th.—*Amathes lunosa* (a new record for us in St. Briavels).

September 22nd.—*Polia flavicincta.*—On August 31st I bred a specimen from a larva found feeding on the blossom of garden *Dianthus.*

October 14th.—*Orgyia antiqua* (Tintern, a ♂ assembled with a bred ♀).

October 16th.—*Polygonia c-album* (second brood).—Bred. The only "wild" example of the autumn brood was found on December 14th, hybernating under the canopy of a bed in my father's house at Tintern.

October 18th.—*Gortyna ochracea* (Tintern).

October 19th.—*Amathes macilenta* (Tintern) and *Cidaria siterata* (*psittacata*) (Tintern, a specimen at ivy-blossom).

October 20th.—*Oporabia dilutata* (Tintern).

October 23rd.—*Amathes lota* (Tintern).

October 28th.—*Mellinia circellaris* (Tintern).

November 2nd.—*Hybernia defoliaria* (Tintern).

November 5th.—*Cidaria miata* (Tintern).

November 6th.—*Himera pennaria* (Tintern).

November 7th.—*Cheimatobia brumata* (Tintern).

November 15th.—*Hybernia aurantiaria* (Tintern).

November 19th.—*Cheimatobia boreata* (Tintern).

December 6th.—*Poecilocampa populi* (Tintern).

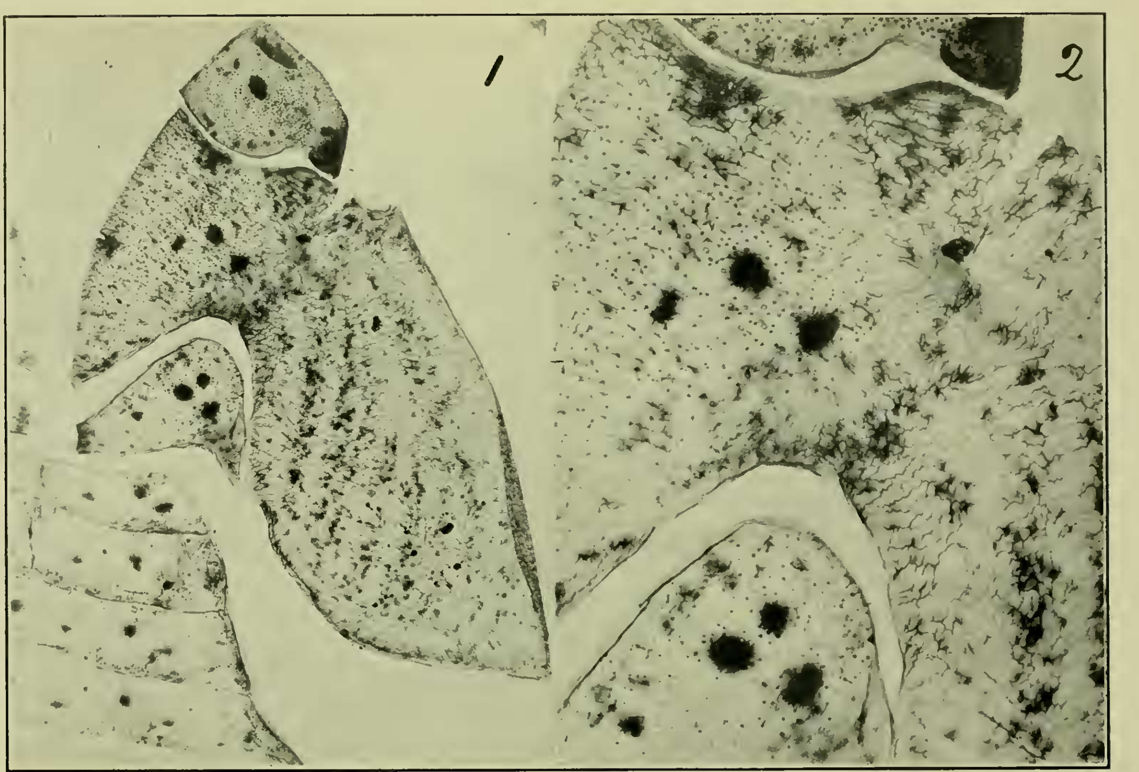
I here mention a few of the larvæ met with during the season that I have not already referred to in the preceding notes:—*Chattendenia w-album* (May 17th, on wych-elm at Tintern), *Polygonia c-album* (on currant and nettle; the larvæ which produced the autumn brood fed up unusually slowly, even in the natural state, and those taken arrived at the perfect state from October 16th to 29th), *Brenthis euphrosyne*, *Anthrocera trifolii*, *Macrothylacia rubi* (abundant locally), *Drepana falcataria*, *Dicranura bifida* (several ova on aspen bushes), *Drymonia chaonia* (May 16th, one larva found by my father on oak at Tintern), *Notodonta ziczac* (a few larvæ and ova on aspen bushes), *Pharetra rumicis*, *Agriopis aprilina*, *Taeniocampa miniosa* (May, on oak; a large brood was found on May 20th, also a few stray larvæ at Tintern; many proved to be "stung"), *T. munda* (May, on oak, ash, etc.), *Amphipyra pyramidea* (May, on lime, currant, and wych-elm), *Cucullia verbasci* (June 21st, half-a-dozen larvæ on *Scrophularia aquatica* (?)) *Amphidasis strataria* (*prodromaria*) (May 26th, on oak), *Hybernia aurantiaria* (May, on oak), *H. leucophaearia* (May, on oak), *Acidalia aversata* (beginning of May, on *Lamium maculatum*) and *Chesias obliquaria* (on broom).

Description of the pupa of Heodes dorilis.

By G. T. BETHUNE-BAKER, F.L.S., F.Z.S.

Whilst staying on Mount Canigou last summer I found a dull apple green Lycænid larva, which remained for a week without eating, so that I wondered what was going to happen as it did not die and apparently showed no signs of pupating. I examined it each day and at last one morning I found it just completing its metamorphosis. On the same evening I examined it again, when it was a most beautiful object the delicacy of its greens and pinks being quite striking.

Plate IX.



The Entomologist's Record.

Portion of pupa-shell of Heodes dorilis.
Fig. 1 × 10. Fig. 2 × 25.

Photo. A. E. Tonge.

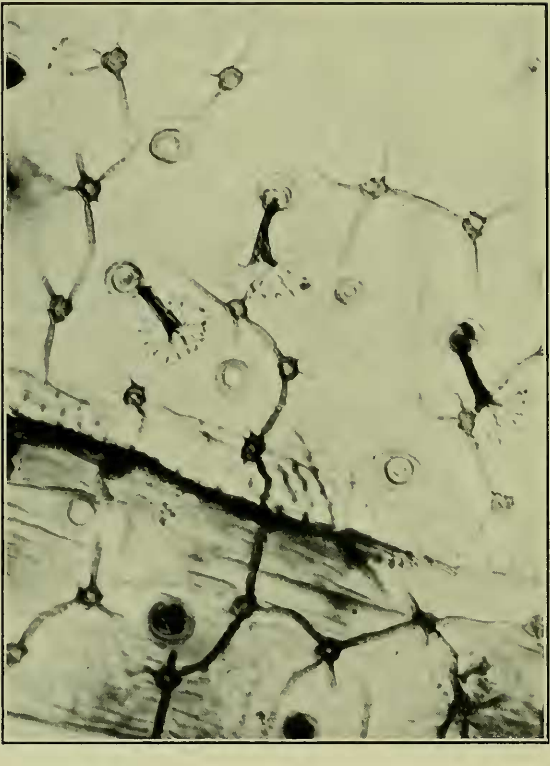


Photo. A. E. Tonge.

Portion of Pupa-shell of Heodis dorilis × 200.

On the second day the colours were much more solid in tone and had become, as time showed, the permanent colours of the pupa, previous of course to the general darkening that comes on just before the emergence of the imago; on the fourth or fifth day after pupation I took the following description of it.

Eyes, face and two thirds of the antennæ dark green, the ventral surface and wing-covers pale yellowish-green with almost imperceptible lines of darker green, the proboscis is also rather darker green, the lateral portion of the pupa above the wing cases is likewise green up to the last segment but one. The upper part of the head is pale pinkish with a blackish dot on each side (? the sockets of the antennæ) the space between the top part of the eyes is paler and separated from the rest by a pale crescent. The thorax is greenish tinged with pink, with a dark green central line, on each side of which, in the centre, is a dark spot; on each side of the thorax before the suture of the wing cases, is a series of three dark dots; the dorsum has a broadish central darkish pink line, on each side of which is a broad pinkish-white stripe interrupted at the segments, these are succeeded by a broader darkish pink stripe, also interrupted at the segmental divisions, edged by a fairly broad white stripe, on the lower edge of these white stripes the spiracles show as dark points ending in a triangular series of three just behind the thoracic shield; below and behind the spiracular dots is a fine dark short diagonal dash on each abdominal segment from the third to the sixth, inclusive. The whole of the dorsal surface is densely covered with very fine short setæ, the lateral part of the abdominal surface being less densely covered.

The larva pupated on July 22nd, and a nice bright female emerged at home on August 10th.

I sent the empty pupa case to my friend Dr. Chapman who has kindly given me permission to publish his description of it.

Description of the Pupa Case of Heodes dorilis. (*With two plates*).

By T. A. CHAPMAN, M.D., F.Z.S., F.E.S.

Specimen of empty case. The front of the thorax is by dehiscence expanded laterally and shortened dorso-ventrally, partly (the former chiefly) by separation of the two sides, partly (chiefly the latter) by curling of the separated portions.

The pupa is 10·5mm. long, of which only 1·8 is behind the wing and antenna cases. The height (3rd abdominal segment) is 4·0mm., the width 4·5mm. at the same place; when alive it obviously narrowed forwards of this in both directions fairly equally, now it does not narrow across, but is reduced dorso-ventrally to 2mm. at front of mesothorax.

The colour is pale yellowish-grey, with many black spots and dots. The most regular of these form a dorsal row, one in middle of each segment; a dorsal row, one behind middle of each segment; a supra-spiracular row of slightly larger dots, and the hind abdominal segments show a subspiracular and two ventral rows. There are very numerous minute dots generally scattered amongst these; the wings show irregular dark markings of more or less coalescent dots, that avoid the lines of nervures. The head is so clouded as to be nearly black. The legs and antennæ are finely dotted, the shafts of antennæ rather dark.

The dehiscence shows a dorsal slit down the thorax, and to some extent continuing laterally between the thorax and abdomen, on one side little beyond the 1st abdominal segment, on the other reaching down the wing margin nearly to the 4th abdominal segment. The prothoracic piece on either side is quite free, except that it is kept attached to the mesothorax by the first spiracle. The antennæ are free nearly all their length from the wings, but are attached to the legs, except just at the base of the first pair. The head remains attached to the maxillæ and first legs.

The posterior end of the pupa is the 9th (with 10th ?) abdominal segment, forming a rounded shield; in front of it ventrally is a deep hollow, whose anterior margin is the posterior border of the 7th abdominal segment. A hand lens hardly reveals any hairs.

The pupa mounted and viewed transparently, presents hardly a point by which it can be differentiated from that of *Rumicia phlaeas*. The ribbed network is almost of the same pattern. The rosettes have their margins more definitely divided into leaflets, generally trefoil, but quadrifoliate, etc., with considerable variation, *R. phlaeas* shows only traces of such division. *H. virgaureae* is more like *H. dorilis*, but they are more irregular in shape in that species.

The "umbrella"— or "fungus"—hairs are very like those of *phlaeas*, perhaps a little larger, an upright solid looking stem, ending in a rather flat expanded flower-like cup, supported by irregular ribs ending in projecting points at the margin. In *dispar*, the hollow of the cup extends downwards to the base, there being no separate stem, the expansion of the cup beginning gradually at the base, instead of suddenly at the top of a stem. *Virgaureae* is of the same type as *dispar*. *Amphidamas* is different, there is no cup, but the top is branched like antlers, generally four. Like *phlaeas* there is a definite dorsal headpiece of much the same size and shape, and the structures otherwise are practically indistinguishable, it has a cremaster of short anchor-shaped hooks, just like *phlaeas*.

On the wings, which are perhaps most easily compared, the rib-netting is of a slightly larger and bolder character than in *phlaeas*.

There being only one specimen of *dorilis*, its variations can only be guessed, but as to *phlaeas*, some pupæ are of nearly uniform ochreous tint, and others vary into black dots and spots, quite approaching this *dorilis*.

The flights of lenticles round the spiracles seem to be rather denser, of larger lenticles than in *phlaeas*, and on the 2nd abdominal segment, they are marshalled into close rows by evanescent lines of ribbing passing between them.

EXPLANATION OF PLATES IX. AND X.

(*Photos. by A. E. Tonge.*)

PORTIONS OF PUPA SHELL OF HEODES DORILIS MOUNTED IN BALSAM.

FIG. 1.—Thorax, wing and first four abdominal segments of right side, × 10. The shade near the front of prothorax is the dorsal headpiece, which is attached to the prothorax, but has here been doubled beneath it.

This shows the dark spotting of the pupa.

FIG. 2 shows a central portion of Fig. 1, × 25. It shows the different pattern of netting on the body and on the wings, the latter being without hairs, lenticles, or rosettes.

It shows also the special pattern of netting across the origin of the wings, both of meso- and meta-thorax.

FIG. 3 is a portion of the margin of an abdominal segment, × 200, showing the umbrella- (fungus-, trumpet-) hairs, several lenticles and the rosettes at the branchings of the netting.

Further experiments on the temporary social parasitism in ants of the genus Lasius, Fab., with a note on Antennophorus uhlmanni.

By W. C. CRAWLEY. B.A., F.E.S.

While staying at Seaton, Devon, last summer, I was able to procure a number of naturally-deälated or freshly-fertilised ♀♀ of *Lasius niger* and *L. umbratus*, after a marriage-flight of these two species on September 15th.

In dealing with ants of this genus, I prefer to use fertile ♀♀, as though I have made experiments with artificially-deälated ♀♀ of *umbratus*, two of which were permanently adopted by queenless colonies of *L. niger* (Extr. 2nd, *Intern. Cong. Ent.*, Oxford, 1912), the ♀♀ never behaved like fertile ♀♀, were always restless, and attempted to escape from the nest. The number of experiments to be described was necessarily limited, since I had only three colonies of *L. niger* in my possession at the time, and I was afraid that the ♀♀ of *L. umbratus*, which, unlike those of *niger*, *alienus*, and *flavus*, are very hard to keep alive in captivity without ☿☿, would not survive the delay necessary to establish fresh colonies of the host species in artificial nests. The experiments, nevertheless, give additional proof of the parasitic habits of *L. umbratus*, eliminate the possibility of ♀♀ of the two species combining to found colonies, and suggest a method by which the host queen, if present, may be destroyed by the parasitic queen. The ♂♂ and ♀♀, some winged and others already deälated, began to appear on the roads about 2.0 p.m. on September 15th. One deälated *umbratus* ♀ was seen to enter a hole under a wall, which proved to be one of the entrances to a nest of *L. niger*, the host species.

Three *umbratus* ♀♀, still winged, and a ♂, were confined together overnight; in the morning the ♂ and one ♀ were dead, the latter cut up into three pieces, head, thorax, and abdomen. One colony of *L. niger* that swarmed on September 15th, had already been observed to swarm earlier in the summer, July 14th.

A. Experiments with a colony of *L. niger*, dating from 1911, containing over 1,000 ☿☿, queen, and brood (nest number, 40).

Exp. 1. September 15th, 1912.—An artificially deälated *L. umbratus* ♀ was placed in the fourth or outer chamber of nest 40. She at once entered the next chamber, which was dark, was surrounded by ants, and taken into chamber two. Many ants attacked her, though a few saluted. She made no attempt at resistance, and before long was dead.

Exp. 2.—Soon after Exp. 1 an artificially deälated *L. niger* ♀ was placed in the outer chamber of nest 40. She was at once attacked and eventually killed. There were no signs of friendliness. This only confirms numerous experiments, which seem to show that this species will never accept strange ♀♀ of its own kind.

Exp. 3. September 17th, 1912.—A naturally deälated (*i.e.*, fertilized) *L. umbratus* ♀ was placed in the outer chamber of nest 40, the entrance to the other chambers having been closed. There were nine ☿☿ with the ♀, all of which were friendly to her. Two days later, all still being on good terms, the barrier to the other chambers was removed. A few fresh ants attacked, but others saluted the ♀. Later she was held by both antennæ and two legs, and as it was evident she would be killed, I removed her.

B. Experiments with a small incipient colony of *L. niger*, founded in 1911, consisting of about 100 ☿ ☿, queen and brood, (nest 42).

Exp. 4. September 15th, 1912.—An artificially deälated *L. umbratus* ♀ was placed in the outer chamber of the nest. Several ants came to her, and were greatly excited, but not hostile. She remained motionless whenever an ant touched her. After ten minutes she entered the dark chamber of her own accord, but was attacked and soon held by every limb. Next day she was dead.

Exp. 5. September 16th, 1912.—A naturally deälated *L. umbratus* ♀ was isolated in a glass tube with one ☿ from nest 42. After some time she killed the ☿. Next day the tube was opened and placed inside the nest. The ♀ came out, entered the inner chamber and patiently submitted to the attacks of a few ☿ ☿. The *L. niger* ♀ then came up to her and saluted her, and kept returning and saluting her for several hours, caressing the intruder with her antennæ. Some ☿ ☿ saluted her also, but later in the afternoon she was fiercely attacked and so badly injured that I removed her.

Exp. 6. September 17th, 1912.—Another naturally deälated *umbratus* ♀ was confined in the outer chamber of nest 42 with a few ants, who at first attacked her; some hours later they were all on friendly terms. In the evening of the 18th I removed the barrier to the inner chamber, but on returning after twenty minutes found the ♀ nearly dead.

C. Experiments with a small colony of *L. niger* consisting of about 200 ☿ ☿ and larvæ, but no queen (nest 41).

Exp. 7. September 16th, 1912.—Two ☿ ☿ from this nest were confined in a tube with a young fertile ♀ of *L. umbratus*, who immediately killed one of them, and attempted to catch the other. I then put another ☿ in the tube. Some time afterwards both ☿ ☿ were killed. Next afternoon I placed the tube in the nest. The ♀ remained in the tube, but several ☿ ☿ visited her and examined her without any hostility. Presently she came out of the tube surrounded by ants, some of which saluted her, and entered the inner chamber, where she walked quietly about, only one or two ☿ ☿ showing any hostility. In about an hour's time, however, there was a complete change in the attitude of the ants, and they began to attack her with great animosity. Eventually, when she was nearly dead, I removed her.

In this case it is conceivable that in the process of killing the three *niger* ☿ ☿, the ♀ acquired the "nest aura," which, however, wore off in about an hour.

Exp. 8. September 18th, 1912.—I confined a naturally deälated ♀ of *L. niger* in the outer chamber of nest 41, with a few ☿ ☿. Unlike the *umbratus* ♀ ♀ she avoided these ☿ ☿ as much as possible. Some hours later there was a dead ☿ on her foreleg. Next morning as she was still uninjured, and a few ☿ ☿ saluted her, I removed the barrier to the inner chamber. She entered of her own accord, but immediately reappeared and tried to escape from the nest. After sometime she again entered the inner chamber, but was seized by an antenna and presently attacked on all sides. By 2.0 p.m., she was dead.

Exp. 9. September 19th, 1912.—I confined, as before, a naturally deälated *L. umbratus* ♀ in the outer chamber of the nest with ten ☿ ☿. She was not attacked at all during the day. Next afternoon I removed the barrier and she very soon entered the inner chamber, where she was seized by three legs and an antenna. At the same time however other ants saluted her. In the evening she was nearly dead, but no longer attacked. Occasionally ants saluted and licked her. She was in such a weak state that I did not think it possible for her to recover, so I left her in the nest. Next morning she had recovered to a certain extent and was able to walk about slowly, though one antenna was badly twisted. No ants attacked her, and in fact she appeared accepted. On the 22nd she had completely recovered, the only trace of the rough treatment she had undergone being her bent antenna. At the moment of writing (March 1913) she is in perfect condition and surrounded by a court of ☿ ☿. Thus it was only in a small queenless colony that the parasitic ♀ was accepted, but in all the nests, so long as the number of ☿ ☿ was small, the ♀ was not attacked. It is conceivable therefore that in nature a ♀ might enter an outlying part of a nest, and be gradually accepted by most of the ☿ ☿ until she was able to enter the nest proper.

No cases are known of the host queen and the parasite living together in a nest, so, unless a ♀ can only be adopted by a queenless colony, it must sometimes happen that a ♀ is accepted by a colony already possessing a queen of its own species. In such a case the intruder must either kill the rightful queen herself, as the queen of *Bothriomyrmex* kills the queen of her host, *Tapinoma nigerrimum*, or the ☿ ☿ of the host species must themselves assassinate their own queen, as do the ☿ ☿ of *Tetramorium caespitum* when they have accepted a ♀ *Anergates atratulus*. (Extr., 2nd Int. Cong. Ent. Oxford, 1912.)

In order to throw some light, if possible, on this problem I confined several queens of *umbratus* with queens of *niger*. The results were striking.

Exp. 10. September 15th, 1912, 7.0 p.m.—A young fertile ♀ of *L. umbratus* and one of *L. niger* were isolated in a tin glass-top box. They avoided each other as much as possible. At 11.0 p.m. the *niger* ♀ was dead.

Exp. 11. September 16th, 1912, 1.0 p.m.—Another pair of young fertile ♀ ♀ were isolated. At 1.40 the *niger* ♀ was nearly dead. The *umbratus* ♀ then came up, and, standing over the *niger*, bit savagely at the pedicel. At 6.10 the *niger* was cut into three pieces.

Exp. 12.—At the same time as the last experiment, another pair of similar ♀ ♀ was isolated. No attacking was observed during the day, but the following morning the *niger* was dead. In this and the previous experiment the ants were confined in glass tubes of half inch bore, stopped by corks. The *umbratus* ♀ ♀ were able to gnaw away the corks to a considerable extent, whereas the weaker mandibles of the *niger* could make no impression on them.

The supply of ♀ ♀ having given out, I was unable to continue these experiments. The last three, however, show that the *L. umbratus* ♀ ♀ will attack *L. niger* ♀ ♀ and are able to kill them easily, in spite of their smaller size, owing to the greater power of their mandibles. A newly-fertilized ♀, then, fortunate enough to come across an incipient colony of *L. niger*, might easily disregard the attacks of the young first brood ☿ ☿, kill the queen (*cf.* Exp. 14), and be established in her place. If she happened on a queenless colony of *niger*, even a populous one, she might, as I have shown elsewhere (*Science Gossip*, May 1900, N.S., vol. vi., no. 72, p. 365, "Alien Queen Ant;" *Ent. Mo. Mag.*, 2nd ser., vol xx., p. 94, 1909; *Trans. Ent. Soc. Lond.*, Parts iii. and iv., p. 657, 1909; etc.), readily be adopted by the ☿ ☿.

I also made the following three experiments with colonies of *L. umbratus* and *L. flavus*.

Exp. 13. September 17th, 1912.—I isolated a young fertile *umbratus* ♀ and gradually introduced *umbratus* ☿ ☿ from an old mixed colony of *niger* and *umbratus*, with queen and brood of the latter species, dating from 1908 (nest 11). The ☿ ☿ were excited and some attacked her. She was attacked from day to day and finally killed.

Exp. 14. September 17th, 1912.—A young fertile *umbratus* ♀ was placed at the entrance to a nest of *L. umbratus* with two *L. fuliginosus* queens and *fuliginosus* brood (nest 33, dating from 1910). She entered the nest, but was attacked by the first ☿ ☿ that met her. She walked on with her assailants hanging to her legs until she reached one of the queens. She immediately sprang on the back of the queen and seized her by the pedicel, the favourite point of attack. Being hampered by the ☿ ☿, she was unable to hold the queen, who escaped. Later in the day the intruder was killed.

Exp. 15. September 17th, 1912.—Another young fertile *umbratus* ♀ was put into a nest of *L. flavus* with queen. She was attacked and killed.

Experiment 14 is an admirable illustration of what I take to be the mode of attack when the intruder meets the rightful queen of the nest. In Experiment 5, however, the *umbratus* ♀ made no attempt to attack the queen, who was persistently friendly to her.

Note on Antennophorus uhlmanni.—The following occurrence shows that ants, though unable to injure the hard bodies of these semi-parasites with their mandibles, yet can easily kill them with formic acid. Ants of most species, however, have a great reluctance to making use of their poison in the recesses of the nest, as in a confined space the acid is fatal to the users themselves. In December, 1911, I removed an *Antennophorus* from a ☿ of *L. umbratus* and placed it on its back on a slide. It vainly attempted to right itself by using its long forelegs as levers. I then held an ant close to the *Antennophorus*, which seized the ant's foreleg and ran with incredible rapidity along the ant's body, finally returning to the underside of the head, the usual position. I then again attempted to remove the *Antennophorus*, but the ant, held by my forceps, began to struggle, and a drop of formic acid appeared at the tip of its abdomen. The *Antennophorus* came into contact with the acid, dropped off the ant, and expired instantly.

Though the ants sometimes feed these commensals, an ant will always struggle violently for some time after one has fixed itself on her, and an ant which bears an *Antennophorus* never seems to leave the inner chambers of the nest. It seems fairly clear that the ants only tolerate these tenacious *Acari* because their mandibles are not powerful enough to remove them, and they are not sufficiently intelligent to employ their formic acid to rid themselves of their embarrassing burdens.

Constantinople and Syrian Butterflies. Corrections and Additions.

By P. P. GRAVES, F.E.S.

HESPERIA ARMORICANUS, OBERTHÜR, AT CONSTANTINOPLE.—After seeing the figures of *Hesperia armoricanus*, Obth., in M. Ch. Oberthür's Fourth Volume of the *Études de Lépidoptérologie Comparée* and in the last number of the *Bulletin of the Geneva Lepidopterological Society*, I began to suspect that the *Hesperia* which I somewhat doubtfully described as *H. alveus* in the *Ent. Rec.*, vol. xxiv., p. 12, was really *H. armoricanus*. Nine specimens taken between May and September, and sent by me to Dr. T. A. Chapman, F.E.S., for examination of the genitalia, *i.e.*, 40 per cent. of my series, prove to be *H. armoricanus*. I believe all, or nearly all, my "*alveus*" to be the newly-discovered, or, rather, newly separated species. *H. armoricanus* would seem to be double, or perhaps triple-brooded here. I have taken specimens from May to October, as recorded in the *Ent. Rec.*, vol. xxiii., p. 317.

AGRIADES THERSITES, CANTENER AT CONSTANTINOPLE.—This rediscovered species must be added to my Constantinople list, the *P. icarus* ab. *icarinus*, which I described as being "almost racial," at Kütchük Tchekmedjé, on August 12th, 1911, proves to be *A. thersites*. Dr. Chapman has kindly verified the genitalia. The ♂ form of *A. thersites*, from Tchekmedjé, on the European side of the Sea of Marmora, differs rather considerably from the local ♂ *P. icarus*. The wings of the male are more compact, the insect is smaller, the ground colour of the upperside is a far more reddish lilac than local *P. icarus*, and that of the underside more yellowish. The female seems also to have rather a darker underside than the local females of *P. icarus*. I have taken one genuine *icarinus* here, in every way resembling ordinary *P. icarus*, save in the absence of the basal spots on the underside forewings, and in a marked tendency to obsolescence in the case of the submarginal row of spots on the underside hindwings. It will be interesting to see whether the spring emergence of *A. thersites* bears a closer resemblance to *P. icarus*.

The difference between the ♀s of the two species, as found here, is not marked, if the distinguishing marks of *A. thersites*, and the somewhat darker average of its ground colour on the underside, as taken here, are left out of consideration.

URBICOLIDS IN SYRIA.—The small "*G. nostrodamus*" recorded by me as taken at Beirut, on August 23rd and 24th, 1910, prove to be *lefebrrii*. I should be glad to know if this species has been previously recorded from Syria. I have since received specimens from Signor F. Cremona, of Beirut, taken in May-June and in August. I have also taken *G. nostrodamus*, at Beirut, on the Dog River, in July, 1907. I think all or nearly all my Egyptian *Gegenes* are *nostrodamus*. From my notes I am inclined to think that the latter is less of a dry ground insect than *G. lefebrrii*, or, to put it differently, that *G. nostrodamus* is more likely to be taken in gardens, clover fields, and irrigated lands than its smaller relative. May I add that, thanks to the kindness of Dr. Chapman, who identified my *G. lefebrrii* for me, I learn that the "form of *H. alveus*" recorded by me from Ain Zahalta Cedars (6,000-6,800 feet), end of July and beginning of August, 1907 (*Ent. Rec.*, xvii., p. 231), and from the Cedar Mountains at nearly 10,000 feet, on August 27th, 1910 (*Ent. Rec.*, xxiii., p. 35), and of which I have received a female taken by Signor F. Cremona at the Cedars of Lebanon (6,400 feet) at the beginning of August, proves to be a form of *Hesperia serratulae*. I have had no acquaintance with *H. serratulae* in Europe, and so cannot say whether these Syrian specimens are close to the ordinary Central and East European form. They seem to me to be nearer to the fine *H. serratulae* figured in *Lép. Comp.*, vol. iv., plate iv., by M. Culot, from specimens in M. Ch. Oberthür's collection. Will readers of the *Ent. Rec.* note that all my records of *H. alveus* at Ain Zahalta and elsewhere in Syria refer to this form of *H. serratulae*.

Finally may I note that Dr. Chapman informs me that an examination of the genitalia of a *Hesperia*, taken by me at the Cedars of Lebanon, in company with *Muschampia proto*, on August 28th, 1910, proves it to be *H. armoricanus*. The specimen resembles on the upperside M. Charles Oberthür's figure of var. *fabressei* (*Lép. Comp.*, IV., pl. lvii., fig. 519), being an "enlarged and exaggerated" form of *H. armoricanus*. The underside, however, does not show the tendency to rust colour remarked by M. Oberthür in Southern and littoral specimens, but is of the usual marbled greenish-olive tint with unusually well developed white bands.

Cteniopus sulphureus, L. A Study in Masculine Mutability.

By W. E. SHARP, F.E.S.

That the male sex in insects is generally more susceptible to variation than the female is well known to most Entomologists, and a striking instance of this principle as operative in Nature has recently been brought to my notice by Mr. Donisthorpe in the case of the Heteromerous beetle *Cteniopus sulphureus*, L., an insect often abundant in localities near the sea and occasionally in more inland districts, and widely distributed throughout the country.

Of 47 specimens of this beetle, which Mr. Donisthorpe had kindly allowed me to examine from his own and the "Bates" collection, I find 21 are ♀ and 26 ♂ examples.

In the former hardly any variation in colour can be detected. They are generally of the dull testaceous yellow which is the normal coloration of the species—some very slightly darker, in which case thorax and elytra are concolorous, some slightly lighter, in which the thorax appears rather more ferruginous than the elytra, the palpi brown or testaceous with the last joint black. The sculpture of the thorax, however, varies slightly, especially in the strength of the lateral basal impression. Seidlitz indeed differentiates under the varietal name *gilvus* the form—"prothorax foveis oblongis basilibus haud argute impressis," but the distinction seems hardly sufficiently constant or important to justify its recognition as a varietal character.

The males, however, were very different, out of the 26 examples examined only 4 were completely normal. The remainder may be arranged under the following varietal names.

Palpi and antennæ quite black, head dark.

1. Thorax and elytra normal in coloration. ♂ *palpalis*, Seid.
2. Thorax and head dark brown or black.
    (*a*) Elytra normal. ♂ *sulphuratus*, Gmel. (*bicolor*, F.)
    (*b*) Elytra grey brown. ♂ *murinus*, Hbst.

A fourth form, in which the elytra are of the normal ochreous with dark apex (var. ♂ *analis*, Seid.), did not appear to be represented among these specimens, but I have an example in my own collection which may be referred to it, taken at Rhosneigr, in Anglesey. It appears, therefore, that the whole of the forms of this insect recognized as varietal by continental authorities also occur in this country, and similarly are confined to the male sex; and the question at once arises: Why is this variability so specially implicit in masculinity? What is the principle which enables or induces the male organism, so much more than the female, to express itself in unequal individual pigmentation? For that is the direction variation takes in this case. Now it is obvious that even the most tentative answer to such questions as these would require far more knowledge than we at present possess of one of the most difficult questions of Biology—the essential meaning of sexuality. But before dismissing the subject as beyond our grasp, a few words may be devoted to expanding it. For whether we hold with that school of biologists of whom, in this country, Prof. Geddes is perhaps the chief exponent, that sex may be expressed fundamentally in terms of Energy, maleness meaning predominant Katabolism, or expenditure of energy in excess of nutrition, femaleness a predominant Anabolism, or nutrition in excess of expenditure of Energy, which theory would imply that organisms are sexually indifferent up to a certain point in their embryonic life, and that the tendency which finally determines sex may depend very largely on conditions of nutrition—or whether we rather adopt the view that sex is unalterably determined in the fertilized ovum—this much at least we must admit, that there seems to be a wider choice of alternatives, or a freer response to Environment, among the cellular determinants, which originate pigmentation in the male than in the female of this insect.

And this is true, although we may interpret the facts in two ways, or, at any rate, recognize that there are two quite distinct lines such an interpretation might take.

(1) We may regard these varietal forms as virtually hybrids—the simple result of inheritance, partial or blended, and their colour differences the expression of such inheritance, in accordance doubtless with Mendelian principles, but far too obscure and complicated for us to disentangle. Or—

(2) They may originate independently in each individual organism in reponse to some special and varying stimulus in the environment, such as foodplant, temperature during critical periods in ontogeny, etc., and in that case we should have to assume a much greater susceptibility to such stimuli in the male than in the female organism.

It is evident that only by a course of careful experimental breeding of *C. sulphureus*, in all its varieties, could we hope to approach the solution of these interesting problems. This of course remains one of those tasks of the future that can be confidently recommended to entomologists in quest of new lines of research, and if I have dwelt on the subject at some length it has been not only for the sake of putting on record as occurring in this country certain forms of insects, which are recognised by definite varietal names on the Continent, but also to hint, how in the manifestations of this far from rare beetle, there may be biological problems of the deepest interest, which our most carefully applied varietal nomenclature helps in no way to solve.

CURRENT NOTES AND SHORT NOTICES.

The standard work, *The Coleoptera of the British Islands*, by W. W. Fowler, issued between the years 1887 and 1891, for some years past had wanted bringing up-to-date, owing to the large amount of details as to the life-histories and distribution of many species that had subsequently accumulated, and on account of the very numerous additions to the coleopterous fauna of this country which assiduous collectors have announced. We are pleased to note that a supplementary volume (Vol. VI.) is shortly to be published comprising the addenda which has been recorded during the quarter of a century which has elapsed since the first volume appeared. There will be 20 additional coloured plates, and a comprehensive paper on the British Myrmecophilous Coleoptera by Mr. H. St. J. Donisthorpe, F.Z.S., F.E.S. We understand that Mr. Donisthorpe has also collaborated to some extent with the author, Rev. W. W. Fowler, M.A., D.Sc., F.L.S., in the main portion of the work.

We have received No. II. of the *Bulletin of the South-Eastern Union of Scientific Societies* containing many items of interest concerning the Societies within its folds and also details of the forthcoming Congress in June, to be held this year at Hampstead, under the auspices of the Hampstead Scientific Society. This will be the Eighteenth Annual Congress, and the President-elect for the year will be Sir Hercules Read, President of the Society of Arts.

Progress is usually slow; especially is it so in the vexed question of Nomenclature. At last it is announced that, in accordance with the decisions of the International Congress of Entomology at Oxford last August, the Entomological Society of London have elected as Representatives of the Society on the National Committee on Nomenclature, Messrs. J. H. Durrant, L. B. Prout, and C. O. Waterhouse. Probably no better selection could have been made; from personal knowledge of them one can say that they are not faddists, they will deal with all questions impartially, they will lean to the expedient rather than to the absolute, their knowledge is unequalled and, what is more, for many years their opinions have been widely sought and accepted.

The Entomological Society have also appointed a permanent Nomenclature Committee, consisting of five *ex-officio* and two elected members with power to add to the number when necessary. The five former are the three representatives of the Society on the National Committee, the British Representative on the International Committee, and the Secretary of the Society; the two latter, the elected members, are Mr. G. T. Bethune-Baker and Dr. Karl Jordan. Thus as at present constituted the Committee of the Society consists of Messrs. G. T. Bethune-Baker, J. H. Durrant, C. J. Gahan, Dr. K. Jordan, Messrs. L. B. Prout, C. O. Waterhouse, and the Rev. G. Wheeler. It is to be hoped that decisions arrived at by this Committee will at once be accepted by all those responsible for our entomological literature, whether magazines, or transactions of Societies, or contributed articles, even though the individual writers may personally disagree, for only by this rigid acceptance can any real stability be assured in our scientific names.

In the March number of the *Ent. Mo. Mag.*, Mr. D. Sharp announces the capture of the true *Bradycellus distinctus* near Bournemouth, a species of Coleoptera new to Britain. The species formerly supposed to be *B. distinctus* was last year pointed out by Dr. Joy to be a new species which he named *B. sharpi.* In the same number Dr. Joy, after examination of the aedeagus of a large number of specimens, has differentiated three species new to science from the well-known *Atheta melanocera*, *viz.*, *A. tomlini*, *A. malleus* and *A. obtusangula.*

William Greenwood Wright, of San Bernardino, California, the author of that fine work *Butterflies of the West Coast*, died last December, at the age of 83. He gave help freely to the writers of the last century, and he was the discoverer of many butterflies and moths, several of which have been named in his honour.

In the *Ent. Rund.*, for December 21st, last, Fritz Hoffman of Krieglach names the form of *Arctia caja* with the black submarginal markings of the hindwing continuous, and including the fringe also black, as ab. *nigrociliata.* Has not this aberration been previously named? Can anyone turn up the reference if it has?

In the *Pomona Journal of Entomology*, the "only entomological magazine published on the Pacific slope" of North America, Mr. Wilhelm Schrader of Los Angeles, California, has published two articles on the breeding of *Junonia coenia* under high and cool temperatures, illustrating his remarks with several figures. In the first article he summarises the results obtained through a series of twenty-two successive generations produced within a period of two years and seven months. These experiments were carried out at a temperature of 90 degrees. In the second series of experiments described, the larvæ and (or) pupæ were subjected intermittently to cool air, often as low as 60 degrees. Besides these regular lines of experiments many side lines were carried on as opportunity occurred. We understand that Mr. Schrader is constructing an elaborate and specially planned building to continue his experimental work on a larger scale.

In the last-issued part of the *Berliner Entomologische Zeitschrift* Klemens Dziurzynski contributes a comprehensive article on *Bupalus piniaria(us)* and illustrates it with two coloured plates containing twenty-one figures of the various local and aberrational forms. He discusses the distribution of the species in Europe and diagnoses shortly the known local races and forms, and names others which have up to the present time not been catalogued. The following is the list of the named forms:—ab. ♀ *fuscantaria* (deep brown and brownish black markings); ab. ♀ *fulvaria* (dark red-brown or yellow); ab. ♀ *unicolora* (uniform ochre-yellow); ab. ♀ *strigata* (cf. *fulvaria* with a strong transverse band); ab. ♂ *flavescens* (with yellow ground, cf. the type); ab. ♀ *kolleri* (with a very strongly marked transverse band, and like the ♂); ab. *dziurynskii* ♂ (like ab. *flavescens* with a strong transverse band); ab. *nana*, (a small ab. *flavescens* ♂); ab. ♂ *tristis* (with very dark lower-wings); ab. ♂ *nigricans* (a very dark form with much increase in the area of the black markings); ab. ♂ *nigricarius* (a uniformly black form); ab. ♂ *anomalaria* (ground colour of all the wings of a smutty light brown); ab. ♂ *albopuncta* (more or less uniformly dark with white or yellow markings in the anal angle of the forewings); ab. ♂ *albomacula* (more or less uniformly dark with light yellowish longitudinal streaks); ab. ♂ *hirschkei* (with the usual dark markings lighter and the light area darker to a yellowish-white); ab. ♂ *mughusaria* (a small alpine form with dull markings); ab. ♂ *nivalis* (the form with the ground colour pure white); ab. ♂ *immacula* (the basal streak on the forewing absent and the hindwing as in the type but duller in ground); ab. ♂ *albidaria* (with much reduction of the black area on all the wings and light yellow ground). A fine gynandromorph is also figured, the R.-side *flavescens* ♂, the L.-side *strigata* ♀.

It is interesting to find (*Nat.*, January, 1913, p. 20) that *Marasmarcha lunaedactyla* (*phaeodactyla*) which in the Appendix to the *List of Yorkshire Lepidoptera* Mr. G. T. Porritt recommends to delete as a county species, was found in plenty flying over its food-plant, rest-harrow (*Ononis arvensis*) at Sledmere by Mr. Wm. Mansbridge.

A new species of *Bledius* is described (*Ent. Mo. Mag.*, vol. xlix., p. 1) by Mr. D. Sharp under the name *Bledius gulielmi*. It is closely allied to *B. annae* and was discovered by Mr. W. E. Sharp in Yorkshire.

Another species of Coleoptera is also (*Ent. Mo. Mag.*, vol. xliv., p. 7) announced as new to Britain by Mr. P. de la Garde, *viz.*, *Homalota aquatilis*, which has been found by him in flood-rubbish at Buckfastleigh and Christow, and by others at Tiverton, S. Brent and Dawlish.

A new species of Diptera is announced (*Ent. Mo. Mag.*, vol. xliv., p. 13), by Mr. J. H. Wood, as *Hilara albocingulata*, from specimens taken on the banks of the Monnow, a tributary of the Wye.

The Migration of insects is always an interesting question. In the *Canadian Entomologist*, vol. xliv., 366, Mr. F. M. Webster, gives details of three such occurrences with the species *Anosia plexippus*, which took place under his close observation.

SOCIETIES.

The Entomological Society of London.—*December 4th*, 1912.—Mr. C. A. Foster, Worcestershire Regiment, Beechwood, Iffley, Oxford, was elected a Fellow of the Society. The President announced the death of Mr. W. F. Kirby, formerly Honorary Secretary of the Society. Mantid Oöthecae.—Mr. Waterhouse exhibited a diagram of the oötheca of a *Mantis* and read notes upon it. Müllerian Associations from Costa Rica, Venezuela and Brazil.—Mr. W. J. Kaye exhibited a number of butterflies with one moth belonging to the principal Müllerian association as found in Costa Rica. A number of specimens, both set and unset, of the principal Mullerian group from Caracas, Venezuela, were also shown. From Santos, South-East Brazil, were shown the principal members of the synaposematic group to call attention to a member of the group that had not been previously mentioned. The species was *Pericopis isse*, a Hypsid moth. Metallic Colour in Chrysids.—Dr. G. B. Longstaff exhibited a small box of Chrysids, and started an interesting discussion on the means by which the metallic coloration was produced. Series of Melanargia japygia and M. galatea from Sicily.—Mr. J. Platt Barrett exhibited series of these two species from Sicily.—A scarce Orthopteron.—Mr. G. T. Porritt exhibited a series of *Platycleis roeselii* taken by himself at Trusthorpe, on the Lincolnshire coast, this year. The forms of Leuceronia argia, F., in the Lagos district of West

AFRICA.—Mr. W. A. Lamborn supplemented his previous account of two families of bred *L. argia* by referring to a short series of females taken at Oni between April 1st, 1910, and January 25th, 1911, a period including a whole wet season and a part of two dry seasons. RUSSIAN PARNASSIUS APOLLO.—Mr. J. A. Simes exhibited a short series of *P. apollo* from the Government of Viatka, with a series from the Alps of Dauphiny and Switzerland for comparison. THE COCOONS OF EPICEPHALA CHALYBACMA, MEYR.—Prof. Poulton showed an enlarged photograph of the cocoons of *E. chalybacma* upon the leaves of Tamarind, *Poinciana pulcherrima*, taken at Pusa on May 31st, 1911, by Mr. T. Bainbrigge Fletcher. A RICHLY-COLOURED EXAMPLE OF PLANEMA ARENARIA, E. M. SHARPE, FROM THE SESSE ISLANDS IN THE VICTORIA NYANZA.—Prof. Poulton exhibited a ♂ specimen of *Pl. arenaria*, taken by Dr. G. D. H. Carpenter on Bugalla, one of the Sesse Islands. THE EFFECT OF HOT AND COLD CLIMATE UPON THE COLOURS OF RUMICIA PHLÆAS, L.—Prof. Poulton exhibited thirty-seven examples of *R. phlaeas*, captured on the same bank at Cerne Abbas, Dorset, in the hot August of 1911 and the cold August of 1912, by Dr. R. C. L. Perkins. Eight out of the fourteen males captured in 1911 were much darker than any of the eight males captured in 1912. The copper tint of the eight 1912 females was more brilliantly lustrous than in the seven 1911 females. POLYOMMATUS ICARUS FEMALES.—Mr. T. H. L. Grosvenor, who was present as a visitor, exhibited a series of *P. icarus* females principally from various localities on the North Downs, arranged according to the year and the emergence to which they belonged. RURALIS ABERRATIONS.—The Rev. G. Wheeler exhibited, on behalf of Mr. R. M. Prideaux, some aberrational forms of *Rumicia phlaeas* and three ♀ "Blues," consisting of one very dark specimen of *Agriades coridon* and two of *A. thetis*, one being of the ab. *urania*, Gerh., and the other having the forewings dark and the hindwings symmetrically of a pale fawn-colour. FEMALES OF AGRIADES THETIS AND POLYOMMATUS ICARUS.—The Rev. G. Wheeler also exhibited the specimens of *A. thetis* ab. *urania*, Gerh., to which he had referred at a former meeting. Also a series of blue ♀s, most of them entirely blue, taken this spring at Notgrove in the Cotswolds, and for comparison the bluest ♀ he had taken there previously, in which the blue scaling was less than the least blue of this spring's captures. SPECIES OF THE GENUS TERACOLUS.—Dr. F. A. Dixey exhibited specimens of *Teracolus ephyia*, Klug., and some allied forms, together with drawings of their respective scent-scales. The following papers were read:—"On some new and little-known Bornean *Lycaenidae*, with a revision of the Thecline genus *Thamala*, Moore," by J. C. Moulton, F.L.S., Curator of the Sarawak Museum. "Descriptions of South American Micro-Lepidoptera," by E. Meyrick, B.A., F.R.S. "Synoptic Table of the British species of *Aleuonota* and *Atheta*, Th.," by Malcolm Cameron, M.B., R.N. "Comparative Notes on *Chilades galba*, Lea., and *C. phiala*, Gr.-Gr., by G. T. Bethune-Baker, F.L.S., F.Z.S. "Notes on the Specific Distinction of certain species in the *orbitulus* and *pheretiades* section of the Genus *Plebeius*," by G. T. Bethune-Baker, F.L.S., F.Z.S. ANNUAL MEETING.—*January 15th*—Mr. J. E. Collin, one of the Auditors, read the Treasurer's Balance Sheet for 1912, showing a balance of £16 18s. 9d. On the proposal of the Rev. F. E. Lowe, seconded by Mr. H. Main, it was unanimously adopted. The Rev. George Wheeler, one of the Secretaries, then read the Report of the Council. Mr. A. Bacot proposed that the Report be adopted. This was seconded by Dr. T. A. Chapman, and carried unanimously. The President then put the list of the Council's nominees for Officers and Council for the Session 1913-1914 to the Meeting, and asked for a show of hands. They were then declared elected unanimously. The President, the Rev. F. D. Morice, then delivered an Address, at the close of which Mr. C. J. Gahan proposed a vote of thanks to him for his services as President and for his address, at the same time asking for its publication as a part of the Proceedings of the Society; this was seconded by Mr. C. Fenn, and carried unanimously. The President having replied with a few words of thanks, Mr. G. Meade-Waldo proposed, and Prof. Selwyn Image seconded, a vote of thanks to the Officers of the Society for their work during the past year, which was also carried unanimously. The Treasurer and both the Secretaries returned thanks, the former referring to the generosity with which Dr. Chapman had for years contributed towards the expense of the plates published in the Transactions.

The South London Entomological and Natural History Society.—*December* 12*th*.—Swiss Coleoptera.—Mr. Ashdown exhibited a collection of over 100 species of attractive Coleoptera obtained by him in Switzerland in June and July, 1911 and 1912, including *Cerambyx cerdo*, *C. scopolii*, *Saperda scalaris*, *Trichius fasciatus*, etc. Melanic N. xanthographa.—Mr. Tonge, very dark *Noctua xanthographa* from Deal at sugar, and a bred series of *Cirrhia citrago* from Dorking. T. pronubana ab. ambustana and an ab. of O. ochroleucana.—Mr. South, for Rev. W. Claxton, a series of *Tortrix pronubana* bred, from Bournemouth, among which was a specimen identical with the *ambustana* of Hübner, it was the only one of the form reared; and a form of *Olethreutes ochroleucana* from near Romford with the apical third of forewing greyish, enclosing dusky, cloud-like markings almost parallel with the termen. S. American Syntomids.—Mr. Kaye, three Syntomid moths: *Orcynia carcarata*, from Caracas, mimicking a wasp; *O. tarsalis*, from British Guiana, mimicking a fossorial wasp, and *Trichura cerberis*, ♂, with long anal projections, mimicking an ichneumon with long ovipositor. The resemblances were most pronounced. Geographical races of M. aurinia.—Mr. Grosvenor, series of *Melitaea aurinia* from more than a dozen British localities, to show the geographical variation. A. adippe and its named varieties.—Mr. Hy. J. Turner, a series of undersides of *Argynnis adippe*, to show the variation obtainable on the continent, including ab. *cleodoxa*, var. *chlorodippe*, var. *cleodippe* (the two last Spanish), ab. *baiuvarica*, ab. *ornatissima*, var. *norwegica*, etc. Shetland Agrotis cursoria.—Mr. Newman, very varied forms of *Agrotis cursoria*, from Shetland. An inhabitant of an Ant's Nest.—Mr. Main, larvæ of *Clythra quadripunctata*, in their cases of excrement, taken by Mr. Donisthorpe from a nest of the ant *Formica rufa*. *January* 9*th*.—New Member.—Mr. F. H. Stallman, of Dulwich, was elected a member. Aberration of P. machaon.—Mr. R. Adkin exhibited three specimens of *Papilio machaon* reared from Norfolk larvæ, having the whole of the lunules on the outer margin of the hindwings more or less strongly orange. Early Records.—Mr. Newman, a living ♀ *Selenia bilunaria* bred outdoors on January 9th, the first of the brood emerged on December 20th. He also showed sprays of alder and buckthorn in leaf. Aegeria andrenæformis (?) in elder.—Mr. Rayward, the working of *Aegeria andrenaeformis* in *Viburnum* and a similar working in elder, which had all the characteristics of that of *A. andrenaeformis*. Californian Butterflies.—Mr. Tonge, several species of butterflies from Redlands, California. Mr. Gahan read a paper on "Mimicry in Coleoptera" and illustrated it with a large number of particularly mimetic species. *January* 23*rd*.—Annual Meeting.—The Reports of the Council and Officers for the past year were read and adopted, and the President read the Annual Address in which, after discussing the affairs of the Society and reviewing the entomological happenings for the year, he summarised his own work in the study of the ova and early stages of the Lepidoptera. The following is a list of the Officers and Council elected to serve for the ensuing year:—*President*.—A. E. Tonge, F.E.S. *Vice-Presidents*.—W. J. Kaye, F.E.S., and B. H. Smith, B.A., F.E.S. *Treasurer*.—T. W. Hall, F.E.S. *Librarian*.—A. W. Dods. *Curator*.—W. West. *Hon. Secretaries*.—Stanley Edwards, F.L.S., and H. J. Turner, F.E.S. *Council*.—R. Adkin, F.E.S., C. W. Colthrup, F. W. Cowham, A. E. Gibbs, F.L.S., A. Russell, F.E.S., W. G. Sheldon, F.E.S., and A. Sich, F.E.S. Votes of thanks were passed to the President and other Officers. Special Meeting.—It was unanimously agreed to appoint an Editor of Proceeding as an additional Officer and to increase the number of the Council from seven to nine. The new rules to take effect as from January 1st, 1913. Ordinary Meeting.—Second and third brood of P. fuliginosa.—Mr. Buckstone exhibited several short series of bred *Phragmatobia fuliginosa* representing second and third broods from Aberdeen, first brood from Horsley, and second brood from Wendover. The Plague Flea.—Mr. Bacot, an enlarged photograph of an Indian flea, reputed to be one of the carriers of plague. Records.—Mr. Dunster, specimens of *Dicycla oo*, *Mellinia ocellaris* and *Miselia oxyacanthae* from Winchmore Hill.

Lancashire and Cheshire Entomological Society.—Annual Meeting.—*December* 16*th*, 1912, Dr. P. F. Tinne, Vice-President, in the chair. New Member.—Mr. Chas. Percy Rimmer, Liverpool, was elected a member. Elections.—The following members were elected officers and council of the Society for 1913. *President*:—F. N. Pierce, F.E.S. *Vice-Presidents*.—R. Wilding, Wm. Webster, and Hugh Main, B.Sc., F.E.S. *Treasurer*.—J. Cotton. *Librarian*.—F. N. Pierce, F.E.S. *Hon. Secretary*.—Wm. Mansbridge, F.E.S. *Council*.—C. B. Williams, R. T. Cassall, F.E.S., L. West, H. S. Leigh, F.E.S., A. E. Gibbs, F.L.S., F.E.S., A. W. Boyd, M.A., F.E.S., C. E. Stott, and P. F. Tinne, M.A. Annual Address.—The Vice-Presidential address by Mr. Claude Morley, F.E.S., entitled "Ichneumons," was read, and a vote of thanks to the author was unanimously carried. Exhibits.—Mr. F. N. Pierce:—*Dianthoecia luteago* and var. *barrettii*, and *D. argillacea*; Mr. Rimmer, a small collection of Macro- and Micro-lepidoptera including *Rumicia phlaeas* ab. *schmidtii*, from Anglesea and a specimen of *Amphipyra pyramidea* from Carnarvon. *January* 20*th*, 1913.—Ant Associations.—A paper by Mr. H. St. J. K. Donisthorpe, F.E.S., was read by the Hon. Sec., the subject being "Some Associations between Ants of different Species." The paper fully described all that is known of these associations, and specially dealt with the relationship between species of *Formicoxenus*, *Anergates*, and *Wheeleriella*. A discussion, showing a general interest in the subject, ensued, and a vote of thanks to the author was carried unanimously. EXHIBITS.—A box of Micro-lepidoptera by Mr. A. W. Boyd, collected in Lancashire and Cheshire during 1912, recording many new localities for species already on the local list. Mr. W. Mansbridge showed a buff male of *Diaphora mendica* from Co. Cork.

REVIEWS AND NOTICES OF BOOKS.

TEXT-BOOK OF BRITISH BUTTERFLIES AND MOTHS. By L. W. NEWMAN, F.E.S., and H. A. LEEDS. 3s. 6d. NET. GIBBS AND BAMFORTH, ST. ALBANS.—This is a thoroughly practical book for the outdoor worker, the worker who means business, *i.e.*, to acquire a real knowledge of the Lepidoptera in nature and at the same time to pick up as much as possible of the real science as he goes along. The first chapter, headed "Hints," coming from the experience of the senior author, will be found of the greatest use, dealing as it does with Ova, Larvæ, Pupæ, Imagines, Assembling, and How to obtain Eggs.

Recognising that probably at the present time the books most used by the collector for the identification of his specimens and for the purpose of getting a groundwork of knowledge of the Lepidoptera of our own country were South's *Butterflies and Moths of the British Isles*, the authors arranged the whole of the English names in alphabetical order, and have used them in the first column of their tabular arrangement, of which the main portion of the book is comprised. The next column contains the specific name with synonyms and the names of the chief varieties and aberrations, with a short diagnosis of each, and often indications of the lines of variation to be looked for. Then comes a series of columns for the months with indications of the period during which the various stages of a species are obtainable. Another column gives general remarks as to range of occurrence, habits, etc. Finally, a column is devoted to the foodplants of the larva, method of pupation, rearing hints, etc.

Then follows a list of the specific names in scientific order with numbers attached as well as the family, genus and English name (South's), so that the exact natural position of any species can readily be ascertained.

The last comprehensive table is an alphabetical list of both the specific and English names, with cross references to the main table, so that it is an easy matter to at once, with a small amount of effort, find out exactly the information one wants to facilitate any projected field work.

In additon there is a list of food-plants, the names used, both English and scientific, being those in the "Wayside and Woodland" Series of volumes written by Edward Step.

Every endeavour has been made to verify and obtain the latest information, and the book cannot fail to be a real assistance to the collector in enabling him to quickly gain such an intimate acquaintance with the life-histories of our Macro-lepidoptera, as will hold him in good stead in the real scientific work, which by its use he will be the sooner able to commence, before his enthusiasm has been quelled by the length of time so often taken in mastering the preliminary field-work.—H.J.T.

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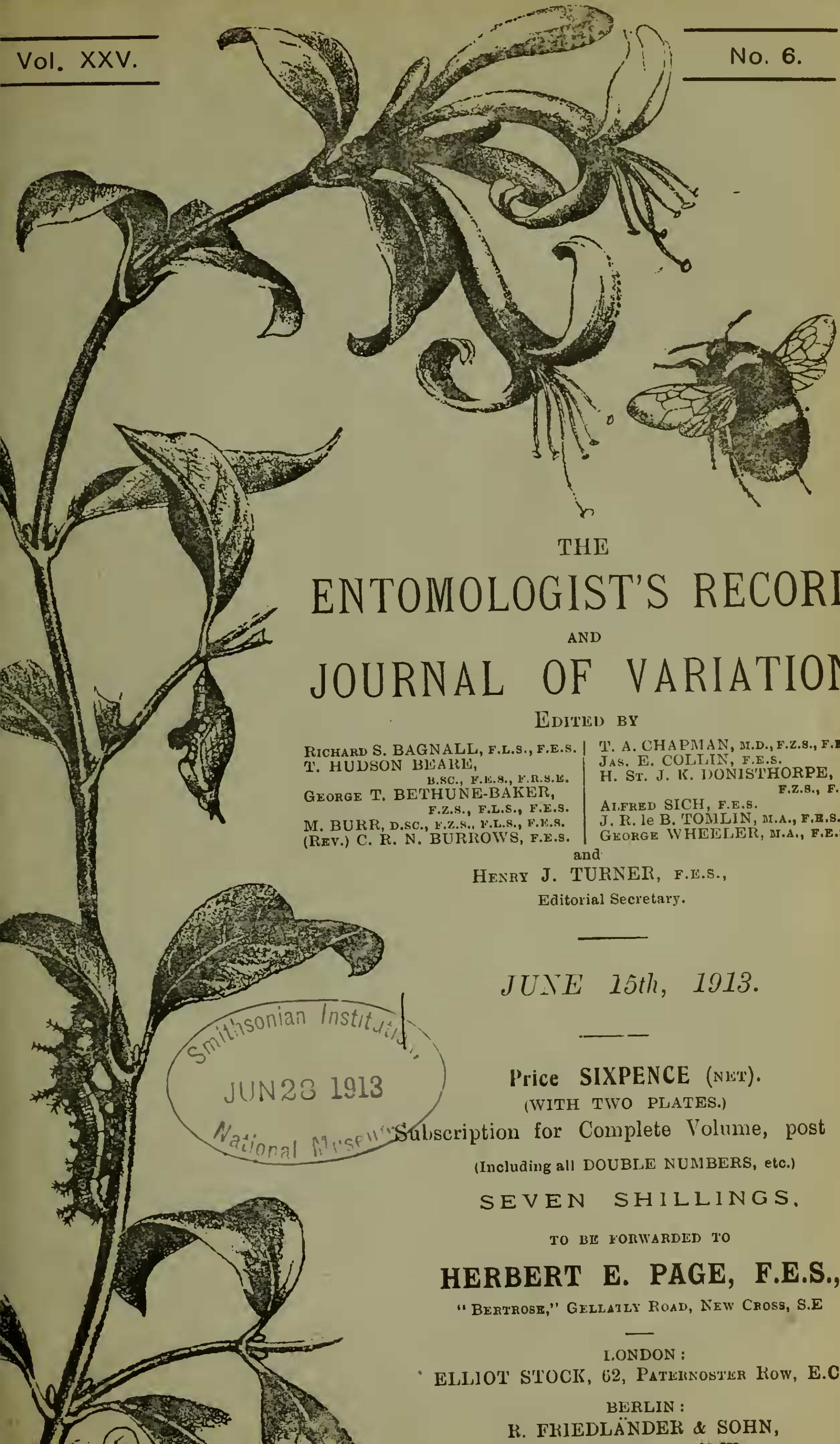

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The TITLES of some of the articles are as follows:—Notes on Butterfly Pupæ, with some remarks on the Phylogenesis of the Rhopalocera."—*Dr. T. A. Chapman, F.E.S.*, "Phytophagic Species."—*Prof. A. Radcliffe Grote, M.A.* "Varieties and aberrations of Noctuæ from Doncaster."—*H. H. Corbett, M.R.C.S.* "The frenulum of the British species of Smerinthus."—*G. C. Griffiths, F.Z.S., F.E.S.* "Eudryas stæ-johannis.,'—*A. Radclifie Grote, M.A.* "Parthenogenesis or Agamogenesis."—*J. W. Tutt, F.E.S.* "Larvæ."—*Rev. G. M. A. Hewitt, M.A.* "Retrospect of a Lepidopterist for 1894." —*J. W. Tutt, F.E.S.* "Generic Names in the Noctuidæ."—*Prof. A. R. Grote, M.A.* "Pupa hunting in October."—*J. W. Tutt, F.E.S.* "Polygamy and Polyandry in Moths." "The nature of certain insect colours."—*W.S. Riding, M.D., R. Freer, M.B., J. W. Tutt, F.E.S., Rev. C. R. N. Burrows, J. Anderson, Jun.* "The Lepidoptera of Swansea."—*Major R. B. Robertson.* "Caradrina ambigua in the Isle of Wight."—*A. J. Hodges.* "The insects of Bourg St. Maurice."—*J. W. Tutt, F.E.S.* "Orrhodia erythrocephala ab. glabra from Devonshire and comparison with O. vaccinii."—*Dr. W. S. Riding, F.E.S.* "Notes on Caradrina ambigua and C. superstes."—*J. W. Tutt, F.E.S.* "Entomology and Entomologists, being the Annual Address to the City of London Entom. Society." Notes on Aphomia sociella" (with plate).—*W. P. Blackburne Maze, F.E.S.* "Apterous females and Winter Emergence"—*E. F. Studd, M.A., B.C.L., F.E.S., L. B. Prout, F.E.S.* "Collecting Noctuidæ by Lake Erie."—*A. Radclifie Grote, M.A.* "Coleoptera at Ipswich."—*Claude Morley, F.E.S.* "Notes on Bombus visurgiæ." "Synonymic Notes on Acidalia humilata and A. dilutaria."—L. B. *Prout, F.E.S.* "The Lepidoptera of Grésy-sur-Aix."—*J. W. Tutt, F.E.S.* "Apatura iris."—*Rev. G. M. A. Hewett* "Scheme of Classification of the Rhopalocera founded on the structure of the Pupæ."—*T. A. Chapman, M.D., F.E.S.* "Glimpses of American Entomology."—*J. W. Tutt, F.E.S.* "The Genus Smerinthus."—*A. Bacot.* "Variation considered biologically: Some notes suggested by the Romanes Lecture of 1894."—*J. W. Tutt, F.E.S.* "Wing structure."—*J. Alston Moffatt.* "On the development of sex in social insects."—*J. W. Tutt, F.E.S.* "The British representatives of the Genus Caradrina."—*L. B. Prout, F.E.S.* "Habits and variation of Lithosia lutarella and its variety pygmaeola."—*J. W. Tutt, F.E.S.* On the gradual disappearance of Lepidoptera from South-Eastern London and its neighbourhood."—*C. Fenn, F.E.S.* "A hunt for Neuroterus aprilinus."—*T. A. Chapman, M.D., F.E.S.* "On the development of pigment in Nemeobius lucina."—*F. J. Buckell, M.B.* "The Macro-Lepidoptera of Keswick."—*H. A. Beadle.* "Varieties of Argynnis selene" (with plate).—*S. G. C. Russell, F.E.S.* "Hadenoid genera with hairy eyes."—*Prof. A. R. Grote, M.A.* "Zygæna minos and its varieties."—*J. W. Tutt, F.E.S.* "Notes on the pupæ of Castnia and Anthocharis."—*T. A. Chapman, M.D., F.E.S.* Besides these articles, a large number of short notes are contained in every number under the following titles: "Scientific Notes and Observations," "Variation," "Notes on Larvæ and Life-histories," "Notes on Collecting," "Current Notes." The reports of Societies are very carefully edited, and only scientific paragraphs published. The "Practical Hints" and "Field work" for each month are quite unique.

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Gravesend during April and May, 1912; Some Beetle Jottings.

By HEREWARD C. DOLLMAN, F.E.S.

My first expedition to Gravesend this year was on April 11th, my last on May 15th; between these two dates I managed to get some collecting there on two or three other occasions. Some of the species I mention have been already recorded from Gravesend, but the fact that they are still to be found there is not without its interest.

Some of my pleasant excursions to this excellent, if somewhat desolate, hunting-ground, were much enhanced both in their pleasure and productiveness by the companionship of Mr. Donisthorpe and Dr. Nicholson.

Bembedium fumigatum, Duft., not uncommon on April 28th, about one ditch; only stray specimens were found, however, on subsequent searches. *Cnemidotus impressus*, F.—This local beetle was fished up not uncommonly on April 28th. *Rhantus notatus*, Berg., not easily captured, but apparently of very general distribution throughout the locality. **Dytiscus circumflexus*, F., rare. **Enochrus bicolor*, Pk., sometimes very abundant. *Helophorus mulsanti*, Rye, found in great numbers upon submerged lumps of clay in one small pond. On roughly breaking up such clods beneath the water, the *Helophorus* rose to the surface in plenty, and were easily collected. *Hydrobius oblongus*, Herbst., very common in the brackish ditches. The best of the *Octhebius* noted were *O. exaratus*, Muls., very rarely, and *O. viridis*, Peyron, in considerable abundance. Some little attention given to the genus *Anacaena* was instructive to me; I found that all the large specimens (*A. globulus*, of course, excepted) proved to be *A. ovata*, Reiche. This form I have found to be very much more generally distributed than *A. limbata*, F. The latter is a very distinct insect when alive, and I have as yet found it only in Epping Forest. The smaller *Anacaena* proved to be both *A. ovata*, Reiche, and **A. bipustulata*, Steph., the smallest ones always being the latter, easily differentiated by the colour of the head and maxillary palpi. On April 11th I sifted a nice series of **Hypocyptus discoideus*, Er., from some sedge refuse, where on May 15th I found *Philonthus quisquiliarius* ab. *dimidiatus*, Er., not uncommonly, but easily outnumbered by the type-form. *Philonthus fumarius*, Grav., was found in small numbers among cut reeds on May 5th, on which day was taken also one of the very rare *Philonthus punctus*, Grav. **Actobius procerulus*, Grav., occurred to me once or twice among pond refuse. **Stenus incrassatus*, Er., and **Stenus canaliculatus*, Gyll., were both found not uncommonly by the side of the ditches, while two (♂ and ♀ *in cop.*) **Stenus fuscicornis*, Er., were taken off a plant in the small chalk pit close to Higham railway station, on May 15th. Sifting pond refuse gave me one or two **Homalium oxyacanthae*, Grav., diligent search failing to reward me with further examples of it. By sifting cut reeds, stray **Choleva agilis*, Ill., were occasionally noticed; this is a species that always limits itself to casual specimens when it comes my way. **Atomaria berolinensis*, Kr., occurred sparingly in dry sea refuse, in company with many common members of the genus. Among some heaps of cut *Sparganium*, etc., I took a short series of **Telmatophilus brevicollis*, Aub. I have to thank Dr. Nicholson for "putting me on to" this choice little beetle. On May 19th I noticed a few *Telephorus fuscus*, L., crawling over thistles in a meadow, but could not find many of it. On this day I was also pleased to take some **Ptinus germanus*, F., in an old gate post inhabited by *Codiosoma spadix*, Herbst. On April 28th, among broken rush and sedge refuse trapped at the end of one of the ditches, I found a specimen of *Haemonia curtisi*, Lac.; subsequent work here, both on this occasion and on other visits, only produced a few more specimens, until May 15th. On this day, however, after finding five specimens by casual search among this ditch debris, I made a detailed examination of the neighbouring ditches and ponds for its foodplant, and I soon found a large dug-out pond, in which *Potamogeton pectinatus* was growing in profusion; from the first few handfuls of which, wrung out and dried, I took quite a sufficient series of the *Haemonia*. When waiting for the "up" train from Higham on my last visit, I noticed several plants of *Ballota nigra* with the leaves riddled by innumerable *Longitarsus ballotae*, Marsh. *Litodactylus leucogaster*, Marsh, I found very rarely, both in the water net and at roots of aquatic plants. The genus *Bagous* is tolerably represented in the ditches of Gravesend. Dr. Nicholson first stimulated me to work at them by taking **B. nodulosus*, Gyll., among heaps of reed refuse more early in the year. Very kindly he showed me the exact spot whence his specimens came, but on that outing I failed to find the beetle. May 15th found me at the spot again—this time by hauling out large masses of "water-weed," and laying them on sheets of brown paper, I managed to detect, very much to my delight, two or three of this fine *Bagous*. Other members of the genus taken at one time and another, during these two months, were:—*B. argillaceus*, Gyll., *B. limosus*, Gyll., *B. tempestivus*, Herbst., **B. frit*, Herbst., and *B. glabrirostris*, Herbst.

Species marked with an asterisk are not recorded from Gravesend in Canon Fowler's work.

Coleoptera noted in the Home Counties during 1912.

By HEREWARD C. DOLLMAN, F.E.S.

On May 31st Mr. H. St. J. K. Donisthorpe came over and suggested to me a day's beetle-hunting in Richmond Park. Our principal quarry was to be *Trinodes hirtus*, F., of which I had previously secured one perfect example in the Park, and he and I together on another occasion, a larva. [The latter now metamorphosed into a well-matured imago.] After removing, and tapping over paper, a considerable amount of very promising "cob-webby" oak-bark, we were each rewarded with one specimen of *Trinodes*. I was very interested in seeing some dozen imagines (mostly ♂♂) of *Tiresias serra*, F., for never before had I seen anything but the larva in a wild state. They were mostly under the more loosely attached pieces of oak-bark, among the dry webby accumulations, in just such situations as the larvæ frequent. A few were noticed, however, crawling on the outside of the bark. Mr. Donisthorpe found a small patch of *Cossus* infection on one of these oaks; and here we found *Cryptophagus scanicus*, L., ab. *patruelis*, Stm., some dozen specimens, with its type-form commonly enough. *Cryptarchus strigata*, F., was also at this tree, but only in small numbers. *Homalium oxyacanthae*, Gr., I took a few of from some large fungi on an old stump; the principal tenant of these fungi was *Gyrophaena affinis*, Man., which was present in extraordinary profusion. In one of the plantations my companion found rather a surprise in a specimen of *Malthinus frontalis*, Marsh., which he swept up. An hour or two, on July 23rd., in Richmond Park, gave me one nice species in *Xylophilus oculatus*, Gyll., of which I took eighteen specimens; all of them were females. I found them in the wood of, and crawling about the exterior of, that oak known to most Coleopterists who have worked the Park, as the dwelling of *Doreatoma* and *Anitys*. The former was seen in great abundance, but not one of the latter was noticed. *Aphodius zenkeri*, Germ., was already to be found in quantity among the deer droppings, somewhat early for this species to be well out, I fancy. The famous water-beetling ponds at Hanwell, on April 17th, after much dredging, yielded a short series of the rare *Coelambus decoratus*, Gyll., one of the few nice beetles yet to be found there. During May I made two or three excursions to Epping Forest, working principally around Chingford and Highbeech. On my first trip (May 10th) quite my best capture was a fine example of *Philonthus nigriventris*, Th., taken from putrid fungoid matter on an old stump at Highbeech. May 26th was the date of my next visit to the Forest. The day's "bag" included:—*Melandrya caraboides*, L., from under Ash bark; *Triplax russica*, L., under bark of Horse-chestnut, and from off Hawthorn bloom; *Telephorus figuratus*, Man., commonly; *Clytus mysticus*, L., several; *Grammoptera holomelina*, Pool., one; *Anaspis garneysi*, Fow., several; *Anaspis rufilabris*, Gyll., common; and *Anaspis subtestacea*, Steph., not uncommon. (The last was in abundance on elder flowers.)

On May 30th I made my last trip to Epping; by beating oaks in the Loughton district I knocked out:—*Grammoptera analis*, Pz., *Rhynchites pubescens*, F., *Coeliodes erythroleucus*, Gmel., and *Magdalis cerasi*, L., amongst many more common forms. Mr. Donisthorpe suggested a trip to Darenth Wood on June 30th. Many of the usual specialities were noticed, and in addition a few other interesting beetles. In the lane, by beating some Blackthorn bushes, we found *Scymnus minimus*, Ross, in plenty. *Mordellistena humeralis*, L., and *M. neuwaldeggiana*, Pz., were swept from flowers. A short series of the ab. *ferrugineus*, Marsh, of *Orchestes alni*, L., were beaten off *Ulmus campestris*. From *Sisymbrium officinale*, between Dartford and Darenth, I took a nice series of *Ceuthorhynchus picitarsis*, Gyll. My best thanks are due to Mr. Donisthorpe for advising me to try for the species, he having taken it in the same locality some years before. On July 7th, at Oxshott, a short series of *Dryophilus pusillus*, Gyll., from dying and dead Larch boughs, and a stray specimen of *Stilicus geniculatus*, Er., were the best captures. Lastly, I must record *Gracilia minuta*, F., from Hove House, Bedford Park. The first specimen was found on June 1st on the window in a spare room; subsequently, others were found crawling on the walls, pictures, etc. It was not until June 6th that I found where they were breeding—this was in the binding within the lid of a travelling trunk. On this day I took over sixty examples from the trunk, and at later dates found this most graceful little Longicorn still emerging in some numbers.

The Coloration Problem.

By W. PARKINSON CURTIS, F.E.S.

(*Concluded from p. 129.*)

Lieut.-Col. Manders argues, p. 449, that it is scarcely reasonable that the same agent should throw one insect back to type and another to the form toward which it is tending, and then goes on to say that we shall be confronted with the same difficulty (*i.e.*, appearance of a form not currently believed to be ancestral) in *Hypolimnas*, yet, as I will show, his own arguments are certainly vitiated by the very same thing, an attempt to explain two diverse results by the same set of causes. I think he will find that *H. misippus* ab. *inaria* is a Mendelian recessive, a consideration of the brood bred by Rev. K. St. Aubyn Rogers shows that this form is a recessive (1912, *Proc. Ent. Soc. Lond.*, p. vii.). Then again he assumes that the brown female *H. bolina* is the oldest form. I was always led to believe that the oldest forms of the female of both *H. misippus* and *H. bolina* were those most like the male, and this belief receives the strengthening help of the fact that the males of the other *Hypolimnas* and *Euralia*, particularly *H. dexithea* from Madagascar, the males and females of which are alike, as well as some of the genera allied to *Hypolimnas*, many of them display much the same markings and coloration as the male of *H. misippus*. If the older form of female be the female like the male, as seems entirely probable, Lieut.-Col. Manders' attempted temperature-moisture explanation is met with this difficulty, both *H. bolina* and *H. misippus* occur abundantly in Ceylon, both are closely allied, yet the same temperature and moisture has driven *H. misippus* female into Danaine coloration and *H. bolina* female into Euplœine coloration. The germplasm of two species so very closely allied is yet so very different that the same external causes have decked one female in many different garbs of Euplœine dull brown and the other female in the gaudy orange yellows of the Danaine. To travel over a continent to the German Cameroons we have a precisely analogous case, the *mima* group almost as closely allied to *H. misippus* and *H. bolina*, under precisely similar conditions to those of *H. misippus*, are driven by those conditions into association with the black and white *Amauris*, whilst the same conditions produce the female *H. misippus* forms *diocippus*, *inaria* and *alcippoides*. I have now before me *Amauris egialea*, *A. hecate*, *A. niavius*, *A. hecatoides*, *L. chrysippus*,* *L. dorippus*, *L. alcippus*, *H. diocippus*, *H. inaria*, *H. alcippoides*, *H. anthedon*, *H. dubia*, *H. dinarcha*, and a form of *H. dubia* bearing a close resemblance to *H. mima*, all from Bipindi, German Kameruns. All, if Lieut.-Col. Manders be right, the diverse results of the same climatic causes, a truly wonderful result. Personally I cannot

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*Note.—Professor Poulton expresses surprise at the occurrence of *Limnas chrysippus* var. *dorippus* in the German Cameroons, and calls my attention to the fact that *Limnas chrysippus* type is rare there. I can only say that my specimen was sent to me together with some 30 or 40 specimens of various species of *Danainae* and *Nymphalinae* all bearing the locality label, and this is the one specimen in respect of which the locality would give rise to comment. The specimens were obtained from a collector whose reliability and care is I believe unquestionable. At any rate I have never found him in error myself. He represented to me that they were a recent batch from that locality, and they bore every evidence of answering that description. The specimens were very fresh and in fine order.

swallow that, but I can see the logic and harmony that at once reigns when the Batesian and Müllerian theories are brought to bear upon that wonderful assemblage of startlingly decorated models and their faithful copies. [Professor Poulton has pointed out that precisely the same difficulty lies in the way of explanation by External Causes in the Nearctic Region (1908), *Trans. Ent. Soc. Lond.*, p. 449 *et seq.*, and Rev. K. St. Aubyn Rogers has shown the same difficulty exists in B. East Africa (1912), *Proc. Ent. Soc. Lond.*, p. 496, and Professor Poulton has called attention to the same difficulty in the *Planema alcinoë*, *P. macarista* and *Acraea alciope* combination, *Bedrock loc. cit.*, pp. 57 *et seq.*].

Moreover the ochreous-orange of *H. chrysippus* and *H. diocippus* is not a prevalent colour amongst blue butterflies in my experience, which I admit is limited. The browns associated with blues, except the little lunules on the wings, are the dull Satyrid browns and not the warm browns of the *Danaidae.*

Besides all this, if temperature be the explanation, why have the males retained their ancestral and conspicuous dress? One would have expected them to have varied likewise under the same stress. Again, p. 456, Lieut.-Col. Manders argues on the basis that variations are necessarily small. They often are, and natural selection is supposed to act upon such small variations, though many of the aberrations and variations that have come under my notice in nature have been rather marked departures than gradual. W. Bateson, in *Materials for the Study of Variation*, has collected a mass of evidence showing that variation often takes place by quite perceptibly sudden steps. When the variation has appeared, the principal of Mendelian heredity would tend to cause it to reappear, and if an advantageous variation, natural selection would gradually stereotype the variation to an extent that might turn the particular set of peculiarities which make the variation into an ascendant form. (*confer* Prof. Poulton, *Bedrock, loc. cit.*, p. 63, for example of such a variation in *Acraea alciope*). Once again, Lieut.-Col. Manders argues that it is difficult to see how a small variation could be selected by a bird or deceive a bird, but it may well be that the detail in which we see synaposematic coloration to-day is the result of the increasing discrimination of birds, as the discriminative faculty would be enhanced in each generation by the fact that the bird who successfully discriminated, would have a better area of food supply, because it would be sure of palatable insects all the time, instead of chancing unpalatable insects, which judging by Mr. Marshall's experiments on the *Mantis*, seem to be positively harmful if sufficient of them be consumed. [*Confer*, G. A. K. Marshall (1908) *Trans. Ent. Soc. Lond.*, p. 96.] I find I have expressed myself almost in Mr. Marshall's words, but I had not read his paper since it appeared, and only referred to it after. On the whole Mr. Marshall has expressed what I mean much more forcibly and clearly than I have done. Professor Poulton remarks to me *in litt.* January 21st, 1913, "In synaposematic approach we do not need that a bird be mistaken, provided it is reminded of a previous experience and approaches the Müllerian mimic cautiously, so as to have every opportunity of appreciating its defence—that might often be sufficient. Or again, if the bird found both model and mimic unpleasant it could more easily remember the experience if they were alike, even though it did not mistake the one for the other. I think this may be important in the early stages of approach."

I fully appreciate that Lieut.-Col. Manders' observations in Ceylon seem to point to a somewhat indiscriminate slaughter of protected species, and not to a discriminative slaughter, but all unpalatable forms have their particular enemies which catch them easily as they are slow and conspicuous.

The Mendelian Theory (which, in its later application as a useful piece of machinery and as accessory to the Darwinian Theory seems to me to be sound) would explain almost entirely the lack of intermediates, and if, and when necessary, would explain the preservation of advantageous intermediates at the time such forms were intermediate and had not become fixed forms. [*Confer*, Dixey, F.A., (1908), *Trans. Ent. Soc. Lond.*, p. 751.] I do not know on what basis Lieut.-Col. Manders assumes that a bird's education is complete, if it is off the nest in May, by the following October, but it is at least as great an assumption as any of those he attacks, and I do not think he gives full weight to the fact that birds from the Northern Latitudes which have migrated southward for the winter, arrive, if I may be allowed to judge by the only migratory birds with which I am acquainted, in their winter quarters in September and would, therefore, be doing any tasting that they might require about the time that *H. misippus* is on the wing.

Judged by the test of stress produced by migrant insectivorous birds and by nesting and nestlings, the cases of supposed Batesian mimicry occurring in these latitudes bear out the theories.

I believe the following list is approximately correct.

Model: *Bombus terrestris* (sp.)

Mimics: *Hemaris fuciformis* (early May), *H. tityus* (early May).

Model: *Leucoma salicis.*

Mimics: *Porthesia chrysorrhoea* (*auriflua*) (late June and July).

Models: *Spilosoma lubricipeda* and *S. menthastri* (not *flava*).

Mimic: *Diaphora mendica* ♀ (June).

Model: *Vespa crabro.*

Mimics: *Trochilium apiformis* (May to June), and *T. crabroniformis** (late May to July).

Model: I do not know, but certainly Hymenopterous insects which are probably armed in some way.

Mimics: *Sciopteron tabaniformis* (June), *Ægeria scoliaeformis* (June to July), *Æ. spheciformis* (June to July), *Æ. andrenaeformis* (June to July), *Æ. tipuliformis* (June to July), *Æ. respiformis* (*asiliformis*) (May to August), *Æ. myopaeformis* (June), *Æ. culiciformis* (April to June), *Æ. formicaeformis* (July to August), *Æ. ichneumoniformis* (July to August), *Æ. muscaeformis* (June to July), and *Æ. chrysidiformis* (June and July).

Looking at the above list it is obvious to the most superficial person that the earliest appears after birds have received an immense accession of numbers by the migrants' arrival, that insect life is at its highest point, that no case occurs amongst them after the nestling period is over, and downward migration, which starts at the end of July, has got into full swing. The cases occur at just that time when one would expect them to occur if the bases of the theories be correct.

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*Note.—I would like to say that I was completely taken in by *Trochilium crabroniformis* on the wing last summer and that I have the greatest difficulty in following *Ægeria culiciformis* and *Sesia vespiformis* (*asiliformis*) on the wing when they get mixed up with Hymenopterous insects. My eyesight is unusually good both in accuracy of focus, truthful rendering of colour and depth of focus, and, moreover, I can use my eyes at a very much wider angle than most people.

To turn to another feature of this island fauna. It is an integral part of the theories that warning colours lose their utility to a large extent, where insect food is scarce. Let us take the insects which exhibit warning colours, and which, by birds' behaviour, I judge to be nauseous:—*Anthrocera filipendulae* (June and July), *Hipocrita jacobaeae* (May to August), *Callimorpha dominula* and *C. quadripunctata* (*hera*) (June)*, *Diacrisia sannio* (May to June), *Parasemia plantaginis* (June), (*Parasemia plantaginis* is very offensive to my nose, it has a peculiarly dank, corpsy smell about it, that is not easy to describe, but which is very penetrating and persistent). *Arctia caia* (June and July), *Arctia villica* (June and July), *Spilosoma menthastri* (*Diacrisia flava*), *S. lubricepeda*, and *S. urticae* (all June and July), *Leucoma salicis* (June and July), *Psilura monacha* (July). (From everything I can see from the carelessness of this moth in its site of rest and general behaviour and odour, I believe it to be protected). *Saturnia pavonia* (April), *Venilia macularia* (May to June), *Abraxas grossulariata* (June to July), and probably the genus *Cabera* (June), one and all appear during the time insect life is most abundant, and when the birds would not be driven to unpalatable food. How different is the case when the downward migration of the hungry yearlings is in full swing, during the winter months and early spring, when our insectivorous winter residents are busy and very hungry, one and all of the lepidopterous insects seek the retiring garb of russet-brown and dead leaf colours, or else dress themselves in the soft greens and greys of the lichen-covered trees. Professor Poulton has also pointed out that Coccinellids, which pass the winter as imagines, hide when the insect life is getting scarce; so also *Vespa*. There also seems to be a tendency, amounting in some cases to a bitterly prejudiced obsession, to throw doubt upon the validity of the results attained by experiment on captive birds, and to treat them as of no account in every case where they show that the supposed protected insect is not palatable. In some cases the writers seem to go to the absurd extremity of rejecting everything in favour of the theories, whilst seizing upon and insisting upon every little point which they think tells against the theories. Then again, I think that those who reject such evidence are clearly wrong, apart from the question of selection of species eaten. It must now be admitted by all, in face of the abundant evidence forthcoming, that birds of almost every species show a marked partiality for insect food of some kind. It is notorious that birds in captivity do not get a sufficiency of insect food either in quantity or variety, since it is so difficult to procure. Accordingly one would expect that a bird in captivity would accept greedily insect food presented to it, unless it were too shy to feed in the presence of man, and that without being too particular as to kind presented. When, therefore, one gets birds under these conditions deliberately rejecting particular species time after time, I believe one to be quite safe in drawing the inference that the insect is unpalatable to that bird and inferentially to all birds of like tastes. I also believe that the fact that the bird and the insect may not necessarily be a bird and insect which would normally meet in the wilds to be a fact of very little moment. R. J. Pocock's conclusions, *loc. cit.*, p. 810, which amply bear me out, are of particular interest in this respect, and I do not think that the fact that *Lanius collurio* has a known partiality for bumble-bees, sufficient to discount the results attained by these highly instructive experiments. Lest it be said that *Lanius collurio*, the Redbacked Shrike, has not this marked partiality, I might mention that my brother and I found a pair of *L. collurio* a little while back that had collected between 30 and 40 bumble-bees and stuck them on a thorn hedge, very neatly pinned against being wanted for the next meal.

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* I have never taken it till late July.—H. J. T.

To my mind Mr. Colthrup and Lieut.-Col. Manders, in viewing the question of protective coloration from the narrow standpoint of attacks on lepidopterous imagines only, give opponents of the theories a handle to which they are in no wise entitled. True it may be that a proved systematic and constant preying of birds upon lepidopterous imagines would place the theories on an immovable basis, but without admitting that no such preying has been proved since the evidence cited and referred to above goes a long way to this end, I maintain that the coloration theories are entitled to all the support they can draw from any source from which they can get it. Were cryptic coloration a phenomenon only observed in the Lepidoptera in the imago stage, I should be with these two writers (see Mr. Colthrup and Lieut.-Col. Manders) in regarding the absence of attacks on the cited *Polia chi* as a fact throwing doubt on the whole theory, but on every hand one finds that this form of concealment is resorted to, and, as shown by Mr. Marshall's observations in South Africa, is often only resorted to by some species at the time when the stress of life is more severe, *viz.*, the dry season.

"The theories must be taken as a whole and contested as a whole." The Rev. G. Wheeler (*in litt.*, October 31st, 1912),* took me to task over that statement because, in his view, I had exhibited the weakness of a specialist (which by the way I cannot pretend to be). Or as another friend of mine remarked when I pointed out to him the extraordinary likeness of *Danaida* (*Salatura*) *genutia* and *Penthema dichroa*, "Oh, you see mimicry in everything." Mr. Wheeler went on to refer me to remarks of his in the (1910) *Entomologist*, p. 214, where he girded at the systematist who pinned his faith to a single character. Now, his views there expressed are, if I may say so with deference, unsound, but his objection to my statement is, I submit, equally unsound. I cannot admit that the soundness of a theory ought to be tested by the measure in which it may be applied to elucidate a set of facts to which it has no true relation. A being with no knowledge of the density of air, but a knowledge of the effect of gravity, would probably explain the rising of a balloon as due to a cessation of the operation of gravity. This mistake does not detract from the soundness of the theory of gravitation. Likewise, there may be specific instances in which a superficial observer might assume a synaposematic combination where such did not exist; but I cannot for the life of me see that that throws any doubt on the correctness of the theories. An individual might readily be led to suppose that a group of Boarmias were a synaposematic combination instead of all being a syncryptic assemblage. Mr. Wheeler suggests that the theories might be applied where almost demonstrably applicable, but rejected in other cases. The theories would lose their value to me entirely if they could not be applied throughout and to their logical extremity. I do not believe that natural laws operate in a piece-meal style, everything that I know tends to make me believe that every law in nature is carried into operation in its entirety and to its logical extremity, and that the supposed exceptions are the result of inter-actions of laws which we have failed to elucidate. Prof. Poulton remarks to me *in litt.*, "There are such accidental resemblances between patterns of butterflies in different regions, but they are very rare, if on the theory of chances we assumed that an equal proportion of the mimics within the same region are also due to accident, it would cut off a small fraction of our examples, and in very many cases we have changes in mimicry in relation to geographical distribution over the region, and such are of course beyond any doubt." I do not, of course, mean to say that it is not possible to fancy a cryptic resemblance existing between two objects from remote parts of the globe, since one lump of dirt is very like another. It may be well that cryptic resemblance to the sand cliffs of Cape Colony would be quite a serviceable resemblance of a sand cliff in Britain. Moreover, I cannot follow Mr. Wheeler in his suggestion that the theories may apply to one Order, and need not necessarily apply to another. Like results are the result of like causes in probably every Order. The physical means and machinery producing the results may vary infinitely, but the primal cause of the tendency and the goal aimed at are alike. For example, assuming the cause of mimicry to be the stress of the struggle for life, and the result attained be a mimetic resemblance, the means used are very various, it may be by increase or reduction of scales, increase or decrease of pigment, but the end attained by these various modifications is a passing likeness, and the operative causes shew the theories at work practically. Lieut.-Col. Manders' Scotch attitude, however canny, will not enable him to occupy a place of neutrality, since there being no other rational explanation of the observed phenomena in the field, if he does not accept the explanation he must be treated as an opponent, and I think the opponents of the theories should state clearly, what I cannot see that they have done as yet, whether they say the Batesian and Müllerian theories are bad as a whole or only bad as applied to lepidopterous imagines.

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* I have no desire to "burke" the publication of any part of this paper, much of which is very valuable and all very ingenious, and it is reproduced as received; but I must protest that it is not "playing the game" to answer in a magazine article a letter that has never been published and was never intended for publication, and which was admittedly both incomplete and hurried. What I wrote in the *Entomologist* I entirely adhere to, but I sincerely hope that no one will take my opinions on this subject at second-hand from the present paper, where they are in some cases caricatured and in others totally misconceived.—GEORGE WHEELER.

If the former, it is open to them to supply, and in fact necessary that they should supply, a rational explanation of the extraordinary likenesses between organism and organism, and organism and inorganic surroundings. I am fully aware that generally it is a bad method of arguing (and it is a method I have no love for) that you must accept my explanation, however futile, unless you can put one less futile in its place. I venture to think, however, that the present views of the coloration problems will hold the field until some general theory is promulgated by the opponents, into which as many of the known facts dovetail as neatly as they do with the present theories. In considering special cases of difficulty such as Bourbon and Mauritius, there is a tendency to lose sight of the striking fact that the present theories, wherever applied throughout the globe have furnished a ready explanation of the phenomena presenting themselves in the particular area considered, and that without curtailment or modification. They have been found to be as general as the application of Newton's laws. Further, that nearly the whole of the known facts and evidence fall into orderly arrangement and logical sequence under the theories.

It has been found by past scientific experience, in practically every field, that attempted special explanations assigning a particular cause or set of causes to each phenomenon isolated, and bearing no proper relation to the cause or causes producing analogous phenomena, have, in the long run, been found to be unsound.

If the opponents merely say that they oppose the application of the theories to lepidopterous imagines, for I cannot see how they can contest the application of the theories to the other Orders and larval stages, do they want two theories where one will do?

Such an instance of duplicated general laws of nature is not within my own limited knowledge.

In plain English, can the opponents of the theories explain the facts by anything but the theories? I trow not.

(I have to acknowledge the kind assistance of Prof. Poulton, who read the above and made a number of helpful suggestions.—W.P.C.)

Addendum.—Extract from the Bird Diary of E. H. Curtis, under date April 5th, 1913:—At Break Hill, Canford, Dorset.—In the fir wood between the *schoenicleus* marsh and the motor road we (*sc.* E. H. C. and W. P. C.) saw a *Sitta caesia* fly to the foot of a fir tree and work up to about fifteen feet from the ground; it made a sudden run up the trunk and nailed a large grey *Noctua* (probably *Xylocampa areola*). It took the moth in its beak and beat it against the bark. It then took the moth up to a cracked limb in the small branches of another tree about 50 yards away, and dislodged a forewing by jambing the insect in the crevice and plucking at it. By this time the insect was fairly "bald," but the result not being satisfactory, he took it out and rubbed the insect about on the bough and stuffed it into another split. Two more wings flew off, and after a little more pecking he swallowed the body and thorax of the insect, wiped the fluff off his beak, and called up his mate, and both departed. The wind was so high that we lost sight of the insect's wings, and it was impossible to recover them." With regard to this it may be noted that the insect was at rest and the bird was searching.—W. P. C.

The Season of 1912 in the Abertillery district of Monmouthshire.

By W. RAIT SMITH, F.E.S.

It is somewhat late in the day to give an account of one's doings in 1912, but, as the season was such an extraordinary one everywhere, it will be as well to have a few notes on the little worth recording from this part of the country.

January and February produced nothing except a few *Phigalia pedaria* ♂ s and some very ordinary *Hybernia marginaria* (*progemmaria*). From several larvæ collected at Weston-super-Mare last year were bred a good many *Hybernia rupicapraria*. I was struck with the large percentage of ♀ s these larvæ produced.

During March things were a little better, although hardly anything but the very commonest spring insects were seen; two *Polyploca* (*Asphalia*) *flavicornis* were taken at rest on fence posts on the 10th, also a solitary *Alsophila* (*Anisopteryx*) *aescularia*: the latter insect has been getting scarcer every year; a few years ago it was exceedingly abundant throughout the district, but has rapidly decreased in numbers each succeeding year, the specimen taken on the 10th was the only example I was able to find, in spite of really close searching for the species, as I was anxious to renew my series. *Malenydris* (*Larentia*) *multistrigaria* was rather early this year, the first examples, three ♂ s and one ♀, were taken at rest on bed-straw on March 10th, and the species occurred fairly commonly throughout the month; by searching with a lantern about 11 p.m. a good many were taken at rest on grass stems, several pairs *in côp.* Most of these were typical; ab. *virgata*, Tutt, was scarce, and only one ab. *nubilata*, Tutt, was taken; the best form was one with a light yellowish-brown ground colour, taken on the 12th. Several *Taeniocampa gothica* emerged in my breeding-cages about the middle of the month, from the 8th to the 14th, a good fortnight before wild emergences.

At the beginning of April the sallows were in full bloom, and on two nights, the 3rd and the 5th, insects were exceedingly abundant at them. By far the larger proportion were *Taeniocampa gothica*. *T. stabilis* and *T. pulverulenta* were plentiful enough, together with hybernated examples of *Orrhodia vaccinii*; *T. instabilis*, as usual, was decidedly scarce, two only were taken. *Pachnobia rubricosa* was not so plentiful as usual. I was pleased to take a dozen fine and varied *Taeniocampa opima* on the 5th; this species is by no means common here. The Pierids were about in fair numbers throughout the month, although not so plentiful as in normal years; *Pieris napi* was the commonest of the three "whites," *P. rapae* fairly common, and *P. brassicae* decidedly scarce.

On April 24th, in a small secluded valley, about three miles from Abertillery, I found *Callophrys rubi* out in extraordinary numbers. I did not happen to have my net with me, but managed to pill-box fourteen examples as they feasted on the few remaining sallow blooms. The next day I again visited this valley fully "armed," and found *C. rubi* even more plentiful than the day before; I could have taken two or three hundred, with very little trouble, if necessary, but was content with 75 picked specimens. Some of these are heavily spotted with white on the underside, a ♂ was taken having the lower wings of a golden shade; the best variety was a ♀ with the underside of a bronzy shade. This aberration was rare, a few were seen approaching it, but only this one example had the underside of a pronounced bronze. The day was cloudy, with intervals of bright sunshine; the moment the sun became obscured not a single *C. rubi* was to be seen, they disappeared as if by magic. I carefully searched to see what they rested on, and after a few minutes had no difficulty in finding them on birch leaves, holly and bilberry, or anything green, not a single one was to be found on the dead grass or bracken. When the sun was obscured it was quite unnecessary to use the net, the insects were easily pill-boxed as they rested, they made no attempt to fly unless the sun shone. *C. rubi* is a fairly common insect here in ordinary seasons, I have never seen this species in such numbers anywhere before. Did the hot dry season of 1911 account for this profusion? I am looking forward with interest to see if this butterfly will be in anything like such numbers in 1913. *Saturnia pavonia* ♂s were fairly common on the hilltops, the ♀s, as usual were not so much in evidence. *Tephrosia crepuscularia*, usually fairly common, was decidedly scarce; only three examples were seen at rest on larch trunks, but I was pleased to find that one of these was of the blackish form, ab. *nigra*, which was not uncommon here a few years ago, but disappeared when the one wood in which they were to be taken was cut down. *Brephos parthenias* was seen in about its usual numbers, flying swiftly round the birches; it is a fairly common insect in this district.

From April 25th a spell of heavy rain set in, which lasted until May 10th without a break. The 11th was dull and cloudy, but as it was not actually raining, I had a few hours' collecting at Aberbeeg, about two miles from Abertillery, where I found insects were fairly numerous, especially *Nemophora swammerdammella*, which was beaten out of beech in little clouds. A few *Tortrix* and other micros were taken in the same way, half a dozen fine dark *Cidaria suffumata* were taken at rest on larch trunks, and other Geometers beaten out of the bushes included *Coremia ferrugata*, *C. designata*, *Larentia tristata*, *Lozogramma* (*Panagra*) *petraria*, and *Xanthorhoë fluctuata*. The last-named insect was very common throughout the month, and was almost the only insect to be seen at light. Collecting at light does not pay in this district, a four or five mile march round the lamps night after night for one or two common moths is not profitable work. A few fine *Mamestra* (*Hadena*) *glauca* were taken at rest on stone walls, together with odd examples of *Mamestra* (*Hadena*) *thalassina*, *M. contigua*, and *M. dentina*. Dusking on the hillsides gave *Cabera pusaria* and *C. exanthemata*, *Perizona* (*Emmelesia*) *albulata*, *Eupithecia vulgata* and *E. nanata*, *Xanthorhoë montanata*, *Coremia ferrugata*, *C. designata*, and *Opisthograptis luteolata* in fair numbers, and *Ematurga atomaria* and *Lozogramma petraria* in abundance. On May 19th I took a fine male *Malenydris salicata* at rest at the foot of a large beech; this is a species I have not seen here before. A second example, a rather worn ♀, was found at rest amongst bilberry on the top of one of our hills, on the 26th. *Cilix glaucata*, not a common insect in this district, was taken at dusk on the 13th. The "Hooktips" were conspicuous by their absence this year. *Prothymnia* (*Phytometra*) *viridaria* and *Heliaca tenebrata* were not to be found in their usual numbers, only a few were seen on sunny afternoons. I failed to find a single *Euclidia glyphica* this year, a species usually fairly common in the district, and only saw one worn *Euclidia mi*. Amongst the butterflies *Coenonympha pamphilus* appeared to be in their average numbers, but the usually common *Nisoniades tages* was decidedly scarce.

On May 28th I had a day's collecting at Torquay. The day was fine and bright in the morning, but clouded over about 1.30 p.m., and remained so for the rest of the day. I was anxious to get a series of

Bapta bimaculata, so spent the greater part of my time beating bushes, etc., for this species. Insects which were about in fair numbers, included *Mesoleuca ocellata*, *Camptogramma bilineata* (common), *Bapta temerata*, *Acidalia remutaria* (common), *Anticlea rubidata*, *Amoebe viridaria* (common), *Xanthorhoë fluctuata* (common), *Asthena candidata* (abundant), *Cidaria suffumata* (worn), *Xanthorhoë montanata* (common), *Ligdia adustata*, *Eupithecia vulgata* and a single *Bapta bimaculata*, which was beaten out of wild cherry. Micros did not seem inclined to move, the only insect beaten out at all freely was *Tortrix ministrana*. Owing to the lack of sunshine butterflies were not much in evidence, the only things noticed were a few *Euchloë cardamines*, all ♂s except one, and a couple of *Pararge egeria*. This is not a very satisfactory result, but, considering the season, one had to be satisfied with small mercies.

The greater part of June was wet and dull, consequently but little collecting could be done in this, the busiest month of the year. Butterflies were very scarce, two or three worn *Brenthis euphrosyne* were seen at the beginning of the month, the allied *B. selene* was not nearly so common as usual; one example with very large light marginal spots, which made the insect look quite conspicuous on the wing, was taken on the 22nd. *Rumicia phlaeas* and *Polyommatus icarus* were very scarce; *Augiades sylvanus* was fairly common, a very light example, a ♀, was taken amongst others on the 22nd. A few worn *Callophrys rubi* were still about at the beginning of the month, also one or two *Euchloë cardamines*; the latter insect has been very scarce this year. The two common Satyrids *Epinephele jurtina* (*janira*) and *Coenonympha pamphilus* were to be seen everywhere. Moths appeared to be in about their usual numbers, whenever the weather allowed one to collect. *Hepialus hecta* swarmed in every wood, *Hepialus fusconebulosa* (*velleda*) was fairly common on grassy banks; a very fine ab. *gallicus* was taken at rest on a fence post on the 9th. On the 3rd I took a ♀ *H. lupulina* at rest on a wall in the centre of the town, the first example of this common insect I have seen here. *Adscita statices* occurred in fair numbers in its very restricted haunts, *Anthrocera filipendulae* and *A. trifolii* were common enough at Crumlin and Pont-llan-fraith. The "Hawk" moths are very scarce in this district, a fine ♀ *Amorpha populi*, found at rest on a stone wall, was brought to me on the 18th, a very late date, this is the only example I have seen this year. *Eumorpha* (*Chaerocampa*) *elpenor*, a single specimen, the first I have noticed in this district, was observed at dusk on the 20th of the month. *Hippocrita jacobaeae*, not a particularly common insect here as a rule, was about in fair numbers this year, a few *Parasemia plantaginis* were seen flying swiftly up and down the steep hillsides; in my experience the best time to take this insect is about 4 p.m., when the flight is not nearly so rapid; the same remark applies to the ♀s of *Macrothylacia rubi* and *Lasiocampa quercûs*, both of the latter insects were seen in about their usual numbers. A single ♀ *Diacrisia sannio* (*russula*) was found at rest on a clump of rushes on the 22nd. I take one or two examples of this insect each year and always in the same spot, I have never taken more than two in any one season, a fact I cannot account for; in other districts in which I have collected, if the species has been taken at all, it has been, as a rule, in fair numbers. The two common "Ermines," *Spilosoma menthastri* and *S. lubricipeda*, were taken freely at rest on grassy banks, and in flight at dusk. *Diaphora mendica* was not noticed this year; a ♀ of this species taken at Crumlin in 1911 laid about 60 ova, the larvæ fed up well on dock and eventually gave me about 40 pupæ, for some reason or other all but three died during the winter, so the net result of these 60 ova was three typical ♀s.

I "sugared" during the month whenever possible, and on the whole found it fairly productive in numbers, though not in species. By far the commonest insect at sugar was *Agrotis exclamationis*, even exceeding in numbers those usual pests at sugar *Xylophasia monoglypha* and *Triphaena pronuba*. *Acronicta rumicis*, *Hadena thalassina*, *H. oleracea* and *H. pisi*, *Xylophasia rurea* and var. *alopecurus*, *X. hepatica*, *Noctua plecta*, *Rusina tenebrosa*, *Agrotis segetum*, *Miana strigilis*, and one or two other common *Noctuae*, were taken plentifully enough at sugar, together with a few *Noctua primulae* (*festiva*), *N. rubi* and *Caradrina quadripunctata*, with single examples of *Apamea basilinea* and *Bombycia viminalis*. The last species I have not hitherto taken in this district. *Acronicta psi* were common in their usual resting-places, the trunks of large beech; from a larva of this species collected in 1911 a fine ♂ emerged on October 3rd, surely a very unusual date; a few *Hadena glauca* were found at rest on stone walls; one or two *Acronicta menyanthidis* were taken off fence posts and walls; this species varies greatly in numbers each year, some seasons it is to be taken in abundance, and in others it is quite scarce. On the 22nd I took a fine fresh *Xylophasia lithoxylea* at rest on a fence post, a few posts further away produced a rather worn *Mamestra* (*Hadena*) *genistae* on the same date. Both these species must be rare in this district, as I have not taken them here before. At dusk most of the common *Noctuae* were to be taken more or less commonly flying over rough herbage. *Acronicta rumicis* and *Leucania impura* were very common, *L. pallens* decidedly scarce, as were the genus *Miana* and *Petilampa arcuosa*. Searching the birch trunks and elsewhere for *Aplecta nebulosa* and *A. tincta* was a failure; *A. tincta* is a scarce species in this district, I have only taken three altogether, but *A. nebulosa* is not uncommon in most seasons. The genus *Plusia* was very scarce this year, only one or two worn examples of the usually abundant *P. festucae* were noticed, the other species were conspicuous by their absence. Amongst the Geometers *Opisthograptis luteolata* was very common everywhere, *Metrocampa marginata* and *Pseudoterpna pruniata* were to be taken in fair numbers in the Llanock Wood, *Boarmia repandata* and *B. gemmaria* were very scarce. *Acidalia fumata* as usual was common enough on every billside, together with swarms of *Lozogramma petraria*, *Xanthorhoë tristata*, *Malenydris didymata* and *Ematurga atomaria*. Beating bushes and rough herbage in the woods gave *Lomaspilis marginata*, *Acidalia imitaria*, *A. remutaria* and *A. aversata*, *Cabera pusaria* and *C. exanthemata*, *Mesoleuca ocellata*, *M.* (*Coremia*) *ferrugata* and *M. designata*, *Amoebe viridaria* and a few other common Geometers. I did not notice *Mesoleuca albicillata* or *Eulype hastata* this year; neither are common insects here, one or two are taken each season, as a rule. The active *Semiothisa liturata* were not uncommon in most woods, a few *Euchoeca obliterata* and *Tephrosia punctularia* were netted. *Eupithecia lariciata* was common enough among larch and *E. nanata* amongst heather. Dusking gave a fair number of *Hydriomena furcata* (*elutata*) and *H. impluriata*, *Cidaria fulvata* and *C. corylata*. A few *Odezia atrata* were noticed in their very restricted haunts. *Ortholitha plumbaria* was rather scarce, this is a somewhat local insect with us. A fine fresh ♀ *Pachys* (*Amphidasis*) *betularia* was taken at rest on a grassy bank on the 22nd. This usually common insect is decidedly scarce in this district. I have only taken two or three altogether. One or two afternoons were spent in a fruitless search for *Entephria caesiata* a species which occurs rarely amongst rocks on the tops of these hills.

On June 15th I went to Pont-llan-fraith principally to ascertain if *Melitaea aurinia* were still to be found there. This beautiful insect was to be found in one field in abundance up till 1907, in which year I took a good series, but for some unexplained reason, has decreased in numbers since ; last year only a few were seen. I was delighted to find *M. aurinia* in decidedly increased numbers, I took a few picked specimens, one or two had very large yellowish marginal spots on the lower wings. The best aberration taken was one with the central spots on the lower wing entirely black, instead of the usual yellow, this example is exactly like the one figured by South in his *British Butterflies*, pl. 65, fig. 6. I found insects were fairly plentiful up till lunch time, but mostly of a common order, the commonest species was *Crambus perlellus* and its var. *warringtonellus*. I was very pleased to take *Botys hyalinalis* a Pyralid new to me as far as this district is concerned. About 2 o'clock it began to rain heavily which put a stop to further collecting for the day.

(*To be concluded.*)

Lepidoptera at Fontvielle. Bouches du Rhône.

By Rev. F. E. LOWE, M.A., F.E.S.

Spending the greater part of June in the South of France, I decided to follow up a suggestion made by Mr. Kenneth Morton, in last year's *Entomologist*, and try the district near Arles, called "Les Alpines." I am bound to say that from a lepidopterist's point of view it proved entirely disappointing. Insects were, as a rule, very ordinary, and with one or two exceptions few in numbers. I entered upon the chase with great hopes, for the locality is weirdly-attractive and unlike any other place I have seen. As will appear, however, the results of the expedition were so insignificant that I should not venture to chronicle them but for two reasons—first, that the Editorial Secretary presses me for an account of my last year's experience, and secondly, that Mr. Tutt so constantly urged that information of what districts do *not* produce was important, as well as what they do. In a word, he desired negative as well as positive evidence. Well, Les Alpines affords little but negative evidence. The dates of my excursions were June 19th, 20th and 21st. We were lodged at the Hôtel du Forum, Arles. Les Alpines, or Les Alpilles as some French authors prefer to call the hills, are reached by the strangest of railways from a little station connected by a footpath with the P.L.M. Station. The line runs through a desolate country skirting the Alpines which lie to the left. The carriages of this *Chemin de fer departmental d' Arles* are remarkable even in a region notable for antiquarian interests, and remains of hoary antiquity—they must be quite seventy years old. Upon examination they proved to be old third-class coaches of our own G.W.R. and M.R. They have, however, been promoted to the dignity of *second* class, and without any attempt to remove the plain English "Third Class." A large 2 has been painted upon the central panel of the doors, which would seem to be the only paint they have received since they were discarded by the English companies. But at the cautious pace at which the train ran we were landed safely at Fontvielle, our distination. After a hot walk of about half-an-hour we reached the beginning of our hunting-ground which is an irregular treeless moor between two ranges of low hills—those on the left Les Alpines, sometimes attaining a fair height, but bare, the lower range on the right is wooded towards the top. There are extensive stone quarries at the base of the hills and strange excavations which are said to date from prehistoric times. The moor is crossed in every direction by rough cart tracks and covered by a rough growth of wiry herbs and grasses. Flowers were not abundant. On the wide spaces between the quarries flew in moderate numbers, *Melanargia galathea*, a few "blues," with here and there *Melitaea didyma* and *Coenonympha pamphilus*. The best thing here perhaps was an occasional *Thymelicus actaeon*, or a still less frequent *Anthocharis belia* var. *ausonia*. But working upwards, always to the right, on higher ground, which was dotted about with some stunted bushes, I came upon my first encounter with *Epinephele ida*. These were scarce the first day, but on the second and third visit very abundant. This was the only butterfly, which was a new experience to me. I secured a long and perfect series of both sexes. A little thing in the habits of this species, at least in this locality, occasioned me some surprise. I should have expected to find its behaviour like that of its near relative *E. tithonus*, which appears always to gambol round bushes, and especially the flowers of the bramble, basking often in dozens on a single small bush. But *E. ida* entirely neglected the bushes for the ground, and showed more the habit of *Pararge megaera* or *Coenonympha pamphilus*. Among the "Moths" I had little better success. I had hoped, on seeing such unusual ground, that I might find myself among interesting species of *Acidalidae* or *Crambidae*, but of the former only two, and of the latter none, revealed themselves, neither did I see a single Zygænid. Two moths, however, I did find which were quite new to me. One fresh specimen of *Evergestis extimalis*, which I boxed under the impression that it was a most remarkable specimen of *Pionea forficalis*. The other species, of which I obtained two male specimens, was a *Noctua*, *Eublemma suavis*, Hb., which I believe is rather a good thing. These were kicked up out of scrubby ground at a still higher elevation. The following is a complete list of the Lepidoptera observed during my three visits:—*Papilio machaon* (2), *Pieris brassicae*, *P. rapae*, *Anthocharis belia* var. *ausonia*, *Gonepteryx cleopatra*, emerging; *Colia edusa*, early brood worn; *Thecla ilicis*, mostly worn, generally very small, and of the var. *aesculi*; *Callophrys rubi*, worn to rags; and *Rumicia phlaeas*, scarce. The "Blues" were represented by *Plebeius argus* (*aegon*), the brood was passing; of the females there were both the brown form and also that with much blue at the bases of the upperside. *Plebeius argyrognomon* was small and scarce. *Scolitantides baton*, a few dark, rather small, and with diminished red band on underside hindwings. *Aricia medon* (*astrarche*), few and

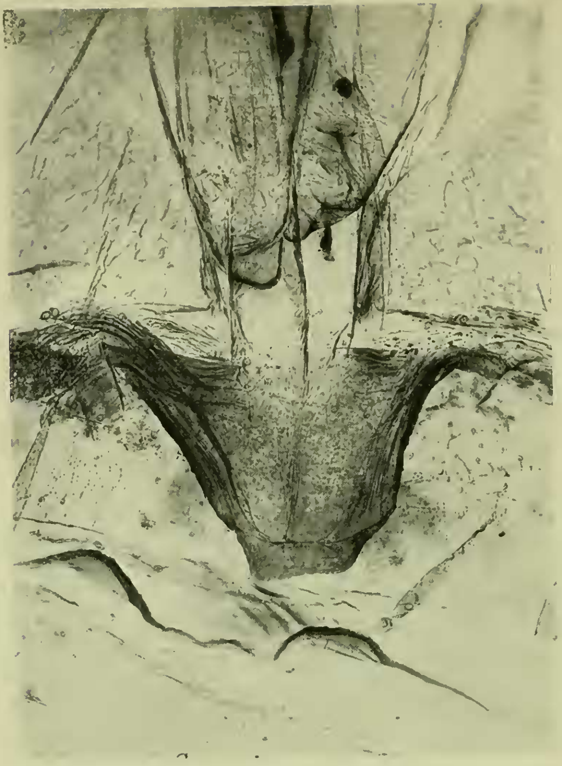


Fig. 1.

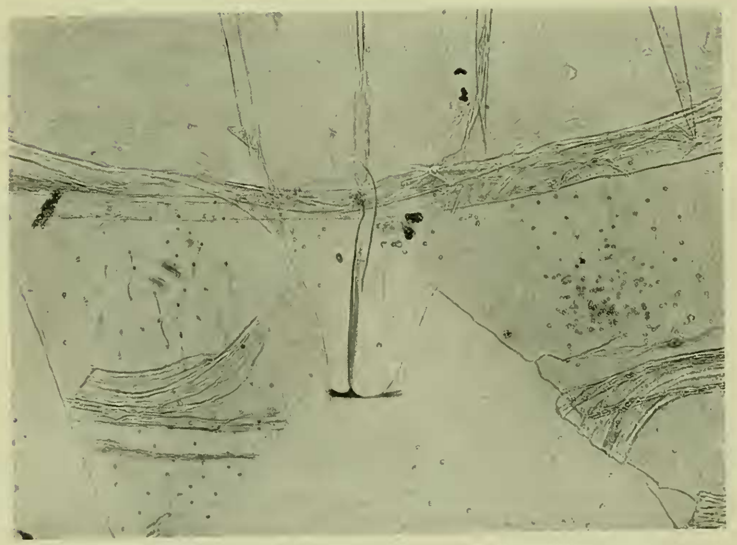
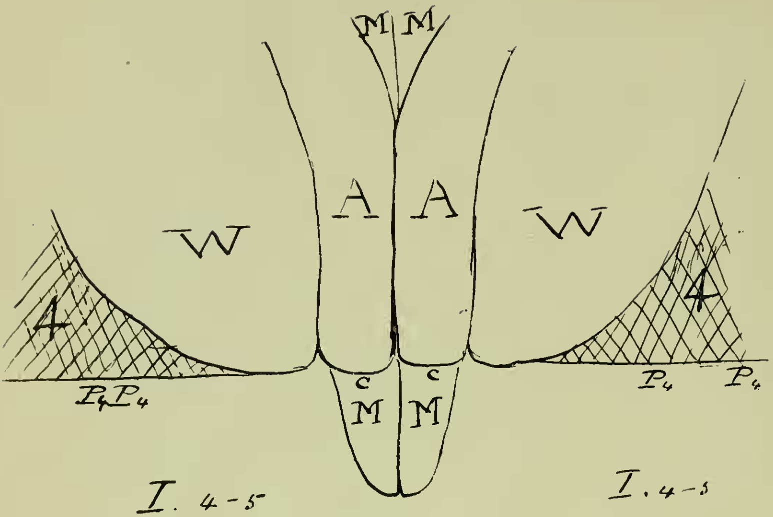
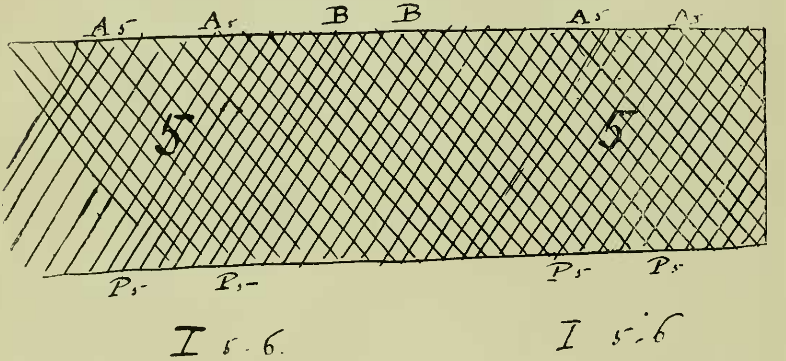


Fig. 2.

Photo. F. Noad Clark.

Pupal Structure of Plebius argus.





Del. Dr. T. A. Chapman.

ordinary. *Polyommatus icarus*, small, and with brown females without a trace of blue. *Agriades coridon*, nearly over and not, I should think, abundant. Of the Vanessids I only record one worn *Pyrameis cardui*. The *Melitaeae* were represented by one very worn *M. phoebe*, and a brood of bright, but not large *M. didyma* just coming out, *Melanargia galathea* was fairly frequent in and around the quarries. *Satyrus circe* (one) would undoubtedly be common later. *Hipparchia semele*, very fine and very abundant, as also were *Pararge megaera*. *Epinephele jurtina*, *E. ida*, and *E. pasiphaë*—all abundant, the last very worn. *Coenonympha dorus*, a few, but very local, probably not fully out; *C. pamphilus*, decidedly scarce. Of the *Hesperidae*, I saw a few *Erynnis altheae*, *Adopaea flava* (*thaumas*), and *Thymelicus actaeon*.

The moths, so far as my notes go, seem to have been very little in evidence, for I can only record five species, *viz.*, *Acidalia ochrata* and *A. rubiginata* (1), *Evergestis extimalis* (1), *Odontia dentalis* (1), and *Eublemma suavis* (2).

It should be noted that the actual Alpines were never explored by me, but only the country lying at the foot of that range.

Pupal Moult of Agriades coridon; The Maxillary Pocket of Plebeiid Pupæ. (*With two plates.*)

By T. A. CHAPMAN, M.D., F.E.S.

Amongst other items communicated to Mr. Tutt will be found in vol. x. of *British Lepidoptera*, p. 226, an account of the pupa of *Plebeius argus* (*aegon*), together with an illustrative plate. I there described a curious pocket to contain the extremities of the maxillæ. This passes, so to speak, into the interior of the pupa, just as a pocket is inside a garment, though with an opening outside. In the case of the pupa the opening is covered by the ends of the wings and antenna soldered down, not unlike a flap covering the opening of a pocket. The maxillæ dip under the antennæ, where these meet each other in the middle line, but pass down behind them, and have 0·6mm. or so of their extremities in this pocket. The arrangement is well seen in the photographs from the pupa shell mounted in balsam making the structures transparent. In the pupa, viewed from outside, unprepared, no trace of this pocket is seen, the antennæ and wings abutting on the anterior margin of the fifth abdominal segment in the usual way. The additional length of proboscis so accommodated is so small that it hardly seems worth while, but the arrangement is very interesting in comparison with the ways in which a long proboscis is disposed of, by an external process, into which a loop near the base projects in some *Sphinges*, and a terminal projection holds the end of the proboscis in *Plusia* and *Cucullia*.

I revert to the matter now, in order to record an observation of the way in which this curious pocket is formed.

On June 21st, 1911, I had the luck to watch a larvæ of *Agriades coridon* moult to pupa. The larval head is, as usual, moulted entire, but has a hood of prothoracic skin all round it, the dehiscence being across the back of the prothorax. The lining of the œsophagus (and stomach ?) withdrawn is about 3·0mm. in length, the middle millimetre being a stiff chitinous piece, the end very delicate and slender.

The wings came down to their full extent during the moult, and the maxillæ, etc., with them. The moult did not occupy many minutes. The maxillæ projected nearly a millimetre (guessed, not measured) beyond the wings.

The 5th abdominal and following segments were very movable and active, more capable of various contortions exercised in pushing back the larval skin than they ever appear to be during larval existence. In only a few minutes after the moult was completed they drew up and assumed very nearly their final pupal positions. Whilst these segments were still very movable, the intersegmental membranes were wide and flexible to allow of those movements. As soon as the descending skin had left the 4th to 5th abdominal incisions the membrane here was alternately stretched and closed up as the peristaltic movements of moulting went on. At first this was, in fact, simply the ordinary action of an incision when the segments on either side are in relative motion, and the projecting maxillæ, extending, say, a millimetre beyond the wings reached halfway across it when it was extended, when it was closed they were between its folds. Then the extent of the incision on either side in front seemed to diminish, as if by shrinking of the membrane, but in front over the maxillæ it continued to open, at each movement, the margin of the fifth segment getting gradually sharper and sharper in the middle line. Then when the incision closed at each movement, this margin came over the ends of the maxillæ, which seemed a little bent backwards. Next, they were not completely uncovered when the incision was most open, but elsewhere less opening was accompanied by gradual shrinking of the intersegmental membrane. Finally, the maxillæ were permanently covered.

The pocket was thus seen to consist of the intersegmental membrane kept stretched as it was during the moult, whilst throughout the rest of its circle it contracted together, so as to be little more than an inappreciable cement, joining the margins of the 4th and 5th abdominal segments together.

The photographs from the *British Lepidoptera* are here reproduced.

Explanation of Plates.

Plate XI.—Fig. 1.—Front of 4th and 5th abdominal segments of pupa of *Plebeius argus*, showing projection of maxillæ into pupal interior through the 4-5 abdominal incisions. × 60.

Fig. 2.—Front of 4th and 5th abdominal segments of pupa of *Plebeius argus*, with portion of 5th segment cut away to show maxillæ projecting into interior of pupa, through 4-5 abdominal incision. × 60.

Plate XII.—Diagram of condition of portion of pupa when involved; the intersegmental membranes are still uncontracted and admit of free movements.

4. Fourth abdominal segment.
5. Fifth abdominal segment.
W, wings. A, antennæ. M, maxillæ.
P_4 P_4. Posterior border of fourth abdominal segment.
P_5 P_5. Posterior border of fifth abdominal segment.
A_5 A_5. Anterior border of fifth abdominal segment.

These are the borders as seen in the mature pupa, but at the moment illustrated they are separated by an expanse of nearly structureless membrane, I. 4-5, I. 5-6, and which admits of the pupal movements. Very rapidly, however, these membranes shrink up, so that in the mature pupa P_4 coincides with A_5, and the intersegmental membrane is represented only by a little thickening of the integument at the incision. At C.C., B.B. however, where the maxillæ lie in front of the membrane, such contraction is modified. B.B. reaches C.C., but the anterior half of the intersegmental membranes remains behind the maxillæ and the posterior half comes in front of them, so as to form the pocket.

SCIENTIFIC NOTES AND OBSERVATIONS.

Attacks on insects and allied questions.—There are several active collectors in this vicinity and we are all interested in "Mimicry" and the various lines of thought which go with it. It is surprising what important things may be and are passed by trained students of nature if they are not in line with the work undertaken. For example, this matter of imperfect specimens of butterflies taken in a day's catch; I suppose about one collector in a hundred would stop to consider the nature of the damage. This season I am preserving and counting all the damaged specimens, and up-to-date find that nearly 3% show unmistakeable signs of encounters with their enemies. Last Sunday I took notice of an occurrence which I have probably seen dozens of times but made no mental note of it. A large, active, grey lizard (very common in California), about eight inches long, ran briskly over the surface of a thickly flowering wild lilac bush and snapped up flies, bees and other insects with the greatest ease. I've seen thousands of lizards running around on the ground and over the rocks, but never imagined that one could travel so freely and easily over a flowering bush even though it was very dense. I have no doubt that most of the torn wings on butterflies in this vicinity are caused by these lizards and am planning to carry on some experiments on this line.

Another interesting line of thought which has attracted my attention lately is connected with the chrysalis stage of butterflies. The most interesting species I have studied so far is *Papilio zolicaon*. I have several hundred chrysalids under observation. Some are nearly two years old and still healthy with only occasional deaths. I shall keep accurate records of larva, chrysalis and imago dates together with sex data for three more years, making a total of five, and then tabulate and try to draw some conclusions. When I tell you that the first lot of about thirty chrysald dates in November and December, 1912, have imago dates running from *three days* to the present time, and with half-a-dozen still in the chrysalis state, you may imagine what lines of thought open up. This southern county is semi-arid and frequently we have several years with very little rainfall. The food-plant is fitful, sprouting after the irregular rains. If the imagines all came out at some certain season, they would very likely have no food-plant upon which to deposit eggs. The protective colouring and evil smell of the larvæ aid to preserve the species, while the irregularity of butterfly season and the apparent chances of failing to mate counteract this. In fact I find that a long continued observation of simply one species brings out all kinds of ideas.

I hope to see some more work done on the bird *versus* butterfly question from now on, and will send you copies of anything that may be published locally.—J. R. Haskin, Los Angeles, California. *May* 14*th*.

Euphagus cyanocephalus (Brewer's Blackbird).—These birds are very common in Los Angeles. Last week I saw two of them chasing a large flying insect which hid in a palm. I thought it was a butterfly and routed it out. It was a large green flying-locust. One of the birds started after it again, but it landed safely in another tree. *Protective* coloration probably saved it. This bird is also a grain eater. Several come to my chicken yard regularly when the grain is thrown out to the hens.—Id.

NOTES ON COLLECTING, Etc.

Appeal to all Entomologists.—The movement in favour of the protection of Nature, which is now extending over the whole world, was applied a few years ago to Lepidopterology as it was noticed that an ever increasing number of collectors, some of whom collect with view to sale, is exterminating certain insects having a limited range. In Switzerland there are butterflies and moths which are certainly exposed to this danger. The Swiss Entomological Association has accordingly decided to accord these insects their protection and save them, if possible, from extermination. The following are especially in question: *Erebia christi*, Rätz. *Plebeius sephyrus* var. *lycidas*, Trapp. *Ocnogyna parasita*, Hb. *Arctia cervini*. Fallou. The Swiss Entomological Association addresses an urgent prayer to entomologists of every country to cease from the destruction of the above mentioned insects and to preserve them for futurity by avoiding for a number of years the restricted districts in which they are to be found. The Swiss Entomological Association ventures to hope that this serious appeal to brother naturalists will not have been made in vain. On behalf of the Swiss Entomological Association.—Dr. J. Escher-Kündig, President, Dr. August Gramann, Secretary, Prof. Dr. E. Bugnion, Dr. A. V. Schulthess, Prof. Dr. M. Standfuss, Dr. R. Stierlin.

[With regard at any rate to two of the species mentioned, *Erebia christi* and *Plebeius lycidas*, the signatories to this appeal are disturbing themselves quite unnecessarily. I have been intimately acquainted with them in their special haunts for many years including 1912, and have no hesitation in stating that both, and especially *E. christi*, are much commoner than they were twelve or more years ago. Moreover, *P. lycidas* is not nearly so local as is usually supposed, and the greater part of the haunts of *E. christi* are so inaccessible that there is no possibility of its numbers ever being materially diminished by collectors; especially since very few of the females ever come within range of the net. One notices also a remarkable absence of the names of those lepidopterists who are best acquainted with the haunts of these insects among the signatures.—G. Wheeler.]

SOCIETIES.

The Entomological Society of London.—*February* 5*th*, 1913.—The President announced that he had nominated as Vice-Presidents for the ensuing session the Rev. F. D. Morice, M.A., and Messrs. J. E. Collin and J. H. Durrant. Moths from British Honduras.—Mr. A. E. Gibbs exhibited a number of insects, principally Syntomid moths, from British Honduras. THE FORMS PICEA AND GAGATES OF FORMICA FUSCA.—Mr. Donisthorpe exhibited ♂ ♂ and ☿ ☿ of *Formica fusca* var. *picea*, Nyl., from the New Forest, and a ♀ from Belgium, and pointed out that it was standing in the British lists as *gagates*, Latr. He gave a history of var. *picea* as British, and exhibited ☿ ☿ and a ♀ of the true *F. fusca*, sub-sp. *gagates*, Latr., from Vienna, and pointed out that *gagates* has not occurred in Britain. SEXES OF GONOMETA SUBFASCIA, WALKER.—Mr. J. A. de Gaye, F.L.S., who was present as a visitor, exhibited five ♂ ♂ and eight ♀ ♀ of *Gonometa subfascia*, Walker, which came from Lagos, S. Nigeria. Mr. de Gaye explained how the males were captured while they were trying to get into the breeding cage in which were two newly-hatched females. Prof. Poulton observed that Dr. Lamborn's previous experiences had made it almost certain that in spite of the great difference in size and appearance these insects were the ♂ and ♀ of the same species, but that Mr. de Gaye's experience had now placed the matter beyond doubt. PAPILIO DARDANUS, BROWN, FEMALE FORM LEIGHI.—Prof. Poulton exhibited the *leighi* female together with one *trophonius*—two members of a family bred by Mr. G. F. Leigh from a female parent of the latter form. FURTHER SYNEPIGONIC PSEUDACRAEAS OF THE EURYTUS, L., GROUP, BRED BY DR. G. D. H. CARPENTER ON BUGALLA, IN THE SESSE ARCHIPELAGO.—Prof. Poulton exhibited two sets of parent and offspring recently received from Bugalla. CORNISH PHRYXUS LIVORNICA.—Mr. B. Harold Smith exhibited 35 specimens of *Phryxus livornica* taken at light in South Cornwall during the last half of May, 1912. A PROBABLE GYNANDROMORPH OF ACIDALIA VIRGULARIA.—Mr. A. Bacot exhibited a specimen of *Acidalia virgularia* having the right wings melanic the left wings of normal grey coloration. RHOPALOCERA FROM THE WESTERN HIMALAYAS AND TURKESTAN.—Mr. N. D. Riley exhibited on behalf of M. André Avinoff a collection of Rhopalocera made on a journey in the Western Himalayas. The following paper was read: "*Trichogramma*, Westw., probably synonymous with *Pentarthron*, Riley (Hymenoptera)." By R. C. L. Perkins, M.A., D.Sc., F.Z.S.

March 5th, 1913.—The following were elected Fellows of the Society:—Miss Blanche A. Coney, The Poplars, Pucklechurch, Glos.; Messrs. Lachlan Gibb, 38, Blackheath Park, Blackheath, S.E.; Gerald F. Hill, Govt. Entomologist, Northern Territory, South Australia, Port Darwin, N.T.S.A.; Lowell Mason, 22 and 23, Club Arcade, Durban, Natal. The Hon. N. Charles Rothschild brought before the notice of the meeting, the Society for the Promotion of Nature Reserves, and briefly outlined its objects. A COLEOPTERON RESEMBLING A DIPTERON.—Mr. J. E. Collin, on behalf Lt.-Col. C. G. Nurse, exhibited three specimens of a peculiar insect which Mr. G. C. Champion had identified as a species of *Myiodites*, a heteromerous Coleopteron, captured by Col. Nurse at Quetta (India) in 1912. A REMARKABLE COLEOPTERON.—Mr. O. E. Janson exhibited specimens of a curious form of Staphylinid beetle from South Brazil, apparently *Ecitomorpha arachnoides*, Wassm. A COLLECTION OF LARENTIA CITRATA, L. (IMMANATA, HAW.), FROM ICELAND.—Mr. L. B. Prout exhibited a series of *L. citrata*, L., from Iceland. AN ALMOND-FEEDING CHALCID.—Dr. K. Jordan exhibited a species of *Eurytoma* together with its live chrysalis from Cyprus, where the species does extensive damage in the almond plantations.

TINEA PALLESCENTELLA BRED FROM HARE'S HAIR.—Mr. R. Adkin exhibited specimens of *T. pallescentella* that he had reared in January last from larvæ found feeding in a bale of hare's hair received from Brandon, Suffolk, in the previous November. DISABLING INJURIES FOUND IN LEPIDOPTERA.—Prof. Poulton exhibited a male specimen of *Acraea peneleos*, Ward (*pelasgius*, Grose-Smith), whose left hind-wing was missing, having been lost in an attack by a wagtail. Prof. Poulton showed examples of specimens belonging to various distasteful groups, exhibiting injuries similiar to those of the above-mentioned *A. peneleos.*

THE SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.—*February* 13*th*.—NEW MEMBER.—Mr. C. R. Wixcey, of Palmer's Green, N., was elected a member. EDITOR OF PROCEEDINGS.—It was announced that Mr. Step had been made Editor of Proceedings and that Messrs. J. Platt Barrett and N. D. Riley were added to the Council in accord with the alterations in the Bye-laws passed at the Special Meeting held on January 23rd. VARIED SERIES OF C. GRAMINIS.—Mr. Buckstone exhibited several aberrations of *Charaeas graminis*, including a remarkably uniform, grey specimen, the markings being scarcely discernable. THE GENUS OPHONUS (HARPALUS).—Mr. West, six species of the Coleopterous genus *Ophonus* (*Harpalus* in part) with the ædœagus mounted by the side of the males, and remarked that the study of this organ had revolutionised the previous identification of the species. A GREGARIOUS DIPTERON.—Mr. Andrews, a series of the Dipteron *Haematobia irritans* taken off the backs of bullocks near Milford Haven. It was stated that the flies had frequently been observed clustered in dense rings around the horns of bullocks. A GEOTRUPES LARVA.—Mr. K. C. Blair, a large living larva of a *Geotrupes* sp. (Dung beetle), and compared it with that of *Melolontha.* SYNTOMIDS AND THEIR MODELS.—Mr. A. E. Gibbs, a large number of *Syntomidae* with their supposed models, taken by Dr. Davies, of Belize, in British Honduras. EPUNDA LICHENEA BRED.—Mr. Tonge, a fine bred series of *Epunda lichenea* from Eastbourne. P. MACHAON ABERRATION.—Mr. Coote, bred *Papilio machaon*, in which the ground-colour approached that of ab. *aurantiaca.* ABERRATIONS OF BRITISH BUTTERFLIES.—Mr. Frohawk, various aberrations of *Melitaea athalia*, *M. aurinia*, and *M. cinxia*, including a fine melanic form of the first species and some fine underside forms of the last-named, together with drawings of an albino *Argynnis adippe*, an albino *Euchloë cardamines*, etc. MICROSCOPICAL EXHIBITS.—The rest of the evening was devoted to microscopical exhibits by Messrs. C. B. Williams, R. Adkin, F. Noad Clarke, W. J. Ashdown, and W. West (Ashtead). *February* 27*th*.—LANTERN SLIDES.—There was an exhibition of Lantern Slides by Messrs. W. J. Lucas (various entomological spots in the New Forest and Surrey, etc.), C. W. Colthrup (lepidoptera at rest, birds' habits, etc.), T. H. L. Grosvenor (views on Colley Hill, the variation in *Pieris napi*, *Brenthis selene*, *B. euphrosyne*, *Melitaea aurinia*, and species of *Anthrocera*), and A. W. Dennis. BALKAN PIERIDÆ.—Mr. A. E. Gibbs, butterflies collected in the Balkans in 1912, including *Pieris manni*, *P. ergane*, *Anthocaris belia*, *Pontia daplidice*, *Leptosia sinapis*, *Colias edusa*, and *C. hyale* and aberrant forms of each species. HYBERNATION OF VANESSA IO.—Mr. Colthrup, a specimen of *Vanessa io* found hybernating in a room in Dulwich. WHITE MARKED ABERRATION of Sphinx ligustri.—Mr. Tonge, a specimen of *Sphinx ligustri*, in which the pink coloration was replaced by white. Aberration of Melitæa didyma.—Mr. Turner, an aberration of *Melitaea didyma* in which the black markings were for the most part of a pale slate colour, and various forms of the female of this species. Bred series of Lampides boeticus.—Mr. Frohawk, a bred series of *Lampides boeticus* of unusually large size. The larvæ fed upon green peas. He also showed some very fine drawings of the protective resting positions of various species of lepidoptera. Five generations of A. virgularia.—Mr. R. South, five generations of *Acidalia virgularia*, bred from ova laid by a ♀ captured at Bishop Auckland, August 7th, 1910. *March 13th.*—New Members.—Mrs. A. Gibbs, of St. Albans, Mr. Geo. Brooks and Mr. Gilbert Storey, of the British Museum (Nat. Hist.), were elected members. Living Larvæ.—Mr. Tonge exhibited living larvæ of *Epunda lichenea* and of *Aplecta occulta*. Photographs.—Mr. Colthrup, some excellent photographs of well-known collecting localities and of the resting positions of various species of the genera *Tephrosia* and *Boarmia*, showing protective resemblance. Rhaphidia larva.—Mr. C. B. Williams, larvæ of the Snakefly, *Rhaphidia notata*, which has occurred not uncommonly in pine stumps at Oxshott. It fed readily on aphides. Thera variata from the N. Forest.—Mr. Platt Barrett, specimens of the true *Thera variata* from the New Forest where the larvæ occurred on Spruce. Larva of Geotrupes stercorarius.—Mr. Brooks, the larva of a *Geotrupes stercorarius* found under a rubbish heap. Balkan Lepidoptera.—Mr. A. E. Gibbs, the Satyrids and Hesperids taken by him in his trip to the Balkans in 1912 and contributed notes on the occurrence and variation of the various species. Tinea pallescentella in Britain.—Mr. R. Adkin, a series of *Tinea pallescentella*, and read a short paper on its history as a British species and discussed his experience in rearing it.—Hy. J. Turner.

OBITUARY.

Lord Avebury.

The Entomological Society of London has lost its oldest, though not its eldest, Fellow, by the death of Lord Avebury, who passed away on May 28th, "full of days, riches and honour," at Kingsgate Castle, near Ramsgate. Rarely indeed is it given to any man to exercise so great an influence in so many departments of life as he did throughout his long career. The mere list of the offices he held in many societies, differing so widely in their scope as the Geological, the Ethnological, the Statistical, the Chamber of Commerce and the Institute of Bankers (to name only a few of those with which he was associated), and the fact that he could write with authority on such diverse subjects as "Prehistoric Times," "The Uses of Life," "The Scenery of Switzerland" and "The History of Money," are enough to fill the ordinary man with wonder "that one small head could carry all he knew." He will probably be best remembered by posterity as the originator of "Bank Holidays," though this was only one of many similar pieces of useful legislation for which he was responsible, but it is rather as an

Entomologist that we would speak of him here. In this department he is specially known as the author of the "Origin and Metamorphoses of Insects," which appeared in 1874, and "Ants, Bees, and Wasps," which was published in 1882, but the long series of his papers on this subject began in 1852, when he was only 18 years of age. Two years earlier he had been elected a member (it was before the days of Fellows) of the Entomological Society of London, of which he was President in 1866-7 (probably the youngest President on record), and again in 1879-80. Though it was long since he had attended the meetings he had never given up his interest in the society, and was an exhibitor at their last conversazione in 1911. His writings, though in style they appear to belong to the lighter side of scientific literature, are in reality always based on a thorough grip of the subject in hand, and are the outcome of first-hand knowledge and personal observation. It is tempting to write at length on the charm of his personality and the wide scope and importance of his public services, but this is not the place to do so. Lord Avebury was twice married, in 1856, and again, five years after the death of his first wife, in 1884; his second wife survives him, and to her and to his numerous family we offer our respectful sympathy.—G.W.

Herbert Druce.

Though not seen of late at meetings, we nevertheless much regret the loss by death of Mr. Herbert Druce; that he has not been seen much among us recently does not mean that he was not as keen as ever in the pursuit of entomology, for as a matter of fact he was working up to his final illness. He evinced a love for nature study at a very early age and was elected a member of the Entomological Society in 1867, so that to-day there are but twelve Fellows his senior. He was elected a Fellow of the Zoological Society in 1870, and of the Linnean in 1872, in both of which he served on the Council and was vice-President, whilst he served on the Council of the Entomological Society in 1885 and also in 1892. His name will always be remembered to Science as the author of the portion of the *Biologia Centrali Americana* that dealt with the Heterocera, his section alone running into three sumptuous volumes. In addition to this he was a prolific describer of new species of insects, his contributions of which, in the *Annals and Magazine of Natural History*, were continuous, and if we include those published in purely Entomological periodicals would probably mount up to several hundred. More than one monograph issued from his pen, and we are under the impression that the material for another was almost ready when the last Reaper claimed his right. He was ever ready to help those who came to him, and the writer has grateful remembrances of very much kindly assistance that was always given in the most cordial manner possible, whilst happy recollections will remain of very many evenings passed under his hospitable roof. A portion of his valuable collections will, we understand, be sold, but we believe the splendid collections of *Lycaenidae* and *Hesperidae* belong to his son, Mr. Hamilton Druce, so that they, we are glad to know, will remain intact, and we must hope that the Heterocera, at least, may find a home on this side of the water. Our sincere sympathy goes out to his sons and daughter.—G.T.B.-B.

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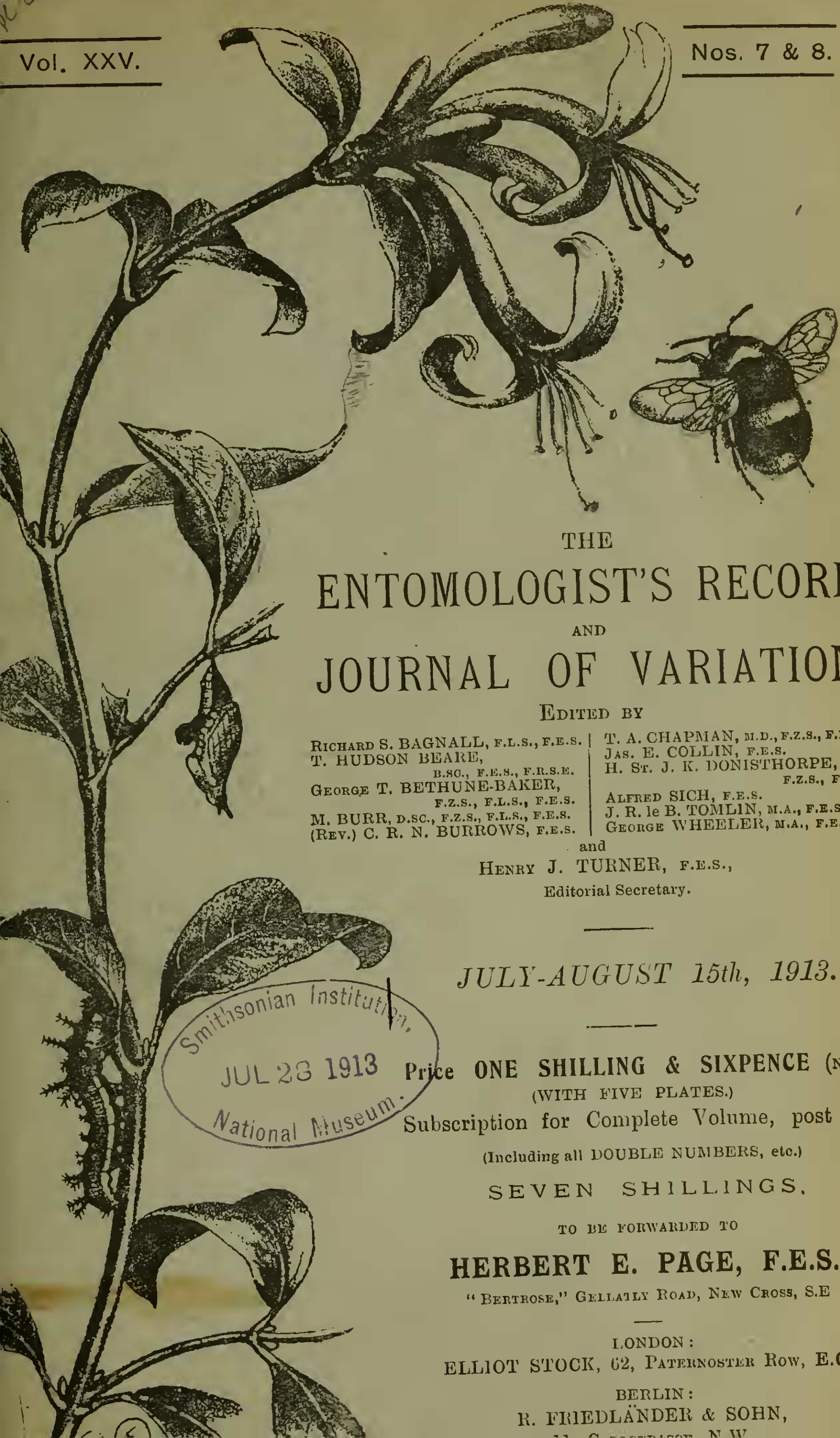

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The Season of 1912 in the Abertillery District of Monmouthshire.

By W. RAIT SMITH, F.E.S.

(*Concluded from page* 163.)

On June 28th I went down to Folkestone for a fortnight's collecting. As things turned out I was very fortunate in selecting this particular fortnight, the weather was beautiful nearly the whole time, the last few days were particularly bright and hot. My object in selecting Folkestone was to try to obtain in particular two of the local insects that favoured locality produces, *viz.*, *Ægeria* (*Sesia*) *chrysidiformis* and *Tapinostola bondii.* I was fortunate enough to get both. Most of my collecting was done in the Warren and on the top of the cliffs between Folkestone and Dover. This particular fortnight is a sort of between seasons for butterflies, so that, generally speaking, I found these insects rather scarce. One or two *passé Pieris brassicae* and *P. rapae* were noticed, not a single fritillary of any species was seen, the "blues" were represented by a few worn *Polyommatus icarus*, *Agriades thetis* (*adonis*) and *Cupido* (*Zizera*) *minimus.* The most plentiful butterfly was *Augiades sylvanus*, which was very common everywhere. *Epinephele jurtina* (*ianira*) was not so common as I expected to find it. At the beginning of July *Aphantopus hyperantus* began to appear in numbers; a good many were netted and examined for ab. *obsoleta*, which I am told is not uncommon here, and other varieties, but without success. *Melanargia galathea* and *Adopaea flava* (*thaumas*) were common enough after the first week in July. On the 11th I took a fine ♂ *Colias edusa*, the only one seen during my stay. A few very ordinary *Rumicia phlaeas* and a single very *passé Nisoniades* (*Thanaos*) *tages* were also noticed.

Day after day was spent in searching for *Æ. chrysidiformis* without success, and I had almost given up hope when my luck turned on the afternoon of July 5th. I was resting on a chalky slope about 4 p.m., when idly disturbing some rough herbage near me with the handle of my net, I put up a small insect, which, when netted, turned out to be the much sought for clearwing. I lost no time in making a close search in the immediate neighbourhood and in about a quarter of an hour two more were taken. The next morning, the 6th, I was early on the scene of my former captures, and in the course of a couple of hours about twenty *Æ. chrysidiformis* were netted. I could have taken a good many more had I wished to. I found this species nearly every day after this, in a good many widely distributed localities, scarce in some places and common in others; I do not think it advisable to give the exact locality where *Æ. chrysidiformis* is to be taken in numbers for obvious reasons. This species is an easy insect to take, once one has got used to their flight, which is low on the ground and rather rapid, and habits. The text-books give the time of flight of *Æ. chrysidiformis* at about noon, in bright sunshine; personally, I found this species most commonly at 3 p.m., but have taken it from 10 o'clock in the morning till 5 o'clock in the afternoon. I contented myself with a moderate series of picked examples, the ab. *flavescens* form was nearly as common as the type. This species varies greatly in size, now, unfortunately, mostly very small. In the opinion of a well-known Folkestone entomologist, to whom I mentioned the matter, this is due to the greed of a few collectors, who have rooted up all the dock they could find for larvæ, so now the insect is forced to take to sorrel as its food-plant. It is a thousand pities this beautiful insect should have suffered so much persecution. As this species does not vary to any extent it is quite unnecessary to have a very long series of it. I should like to appeal, with all due respect, to my brothers of the net, to be moderate in their demands when they meet with *Æ. chrysidiformis*, or any other rare insect. It is a foolish policy to "kill the goose that lays the golden eggs." I made a close search whilst at Folkestone for other species of *Ægeriidae* (*Sesiidae*), and on July 8th was fortunate enough to take three *Æ. ichneumoniformis* as they flew in the early morning over a steep piece of broken ground; two others were taken on the 10th and 11th in widely separated localities. This little clearwing appeared to be rather scarce, these five examples, of which two were males and three females, were all I could find. *Æ. ichneumoniformis* is an awkward insect to take, it has a habit of flying very low to the ground and with considerable rapidity, its small size and inconspicuous colouring makes it a very difficult insect to see. I did not find sweeping herbage, as recommended in some works, a success, but possibly, with more experience, I would have taken this insect in greater numbers.

Searching fence posts on the Warren and elsewhere was not so productive as I expected, the most common insect taken in such situations was *Xylophasia lithoxylea*, and other species taken more or less commonly included *Xylophasia monoglypha*, *Cucullia umbratica*, *Hadena* (*Mamestra*) *brassicae*, *H. oleracea*, *Acidalia aversata*, *A. marginepunctata*, *Eupithecia centaureata*, *E. vulgata*, several *Tortrices* and other micros, and about a dozen *Sphinx ligustri* mostly in perfect condition. One post in the Warren appeared to be specially favoured by this large moth, as four examples were taken off on consecutive afternoons.

Beating bushes and rough herbage gave a good many insects principally Geometers and Micros. By far the commonest insect seen was *Euclidia glyphica*, scores could have been taken had one wanted them, *Venilia maculata* were to be beaten out of every bush, *Ortholitha bipunctaria* was very common on chalky slopes, the males of of *Diacrisia sannio* (*russula*) were common enough amongst long rank grass, the females as usual were not so much in evidence, and a couple of very fresh *Endrosa* (*Setina*) *irrorella* were disturbed out of similar places. I was surprised to pick up a rather worn ♀ *Bupalus piniaria* from amongst the rank grass at the top of the zig-zag path, far enough away from the nearest pines, it must have been blown out of its usual haunts. A fine fresh ♀ *Arctia villica* was found at rest under a gorse bush. Other insects beaten out of bushes included *Camptogramma bilineata* (abundant), *Melanthia procellata*, *Nemoria viridata*, *Hemithea strigata* (common), *Phibalapteryx tersata* (common), *Abraxas grossulariata* (common), *Lomaspilis marginata* (common), *Eupithecia haworthiata* (*isogrammaria*) (abundant), *E. pumilata* (common), *E. succenturiata* and *E. scabiosata*, *Acidalia trigeminata*, *A. bisetata*, *A. ornata* and *A. aversata*, *Strenia clathrata* and a few fine fresh *Aspilates gilvaria*, *Ematurga atomaria*, of a much lighter form than we get in Abertillery was common enough, one ♀ I took was marked exactly like a male, *Eulype* (*Melanippe*) *unangulata* and *E.* (*M.*) *montanata*, *Coremia ferru-*

gata and a single *Angerona prunaria*, together with a good many *Tortrices* and other micros.

Dusking, which was fairly successful, gave most of the Geometers I have just mentioned, with the addition of *Ourapteryx sambucaria*, *Hydriomena impluviata* and a single *Leptomeris* (*Acidalia*) *strigilaria* taken on July 6th, which was probably the best capture of the holiday. Several evenings after this were spent in the Warren in the hopes of *L. strigilaria* turning up again, but without success. A few common *Noctuae* were taken at dusk, but nothing worthy of mention except *Pyrrhia* (*Characlea*) *umbra* of which I netted four rather worn examples. The weed-grown sides of a small stagnant pond was a rather productive hunting ground at dusk, *Leucania pallens* was very common here, but even this insect was exceeded in numbers by the beautiful *Alucita* (*Aciptilia*) *pentadactyla*, which were flying gently, in scores, over the weeds like animated snowflakes, in company with several *Schoenobius forficellus* and *Cataclysta lemnata*.

On the night of July 10th I took my first *Tapinostola bondii*, which was found at rest, about midnight, on a grass stem. The next night I again visited this particular spot just at dusk. I was fortunate enough to find *T. bondii* about in fair numbers, but unfortunately rather *passé*, a dozen fair examples were taken. This very local insect, to get which was one of my objects in visiting Folkestone, is confined to an extremely restricted area, the exact locality I do not intend to divulge. The time of flight is of very short duration, before 8.30 p.m. not a single example is to be seen, they appear on the wing all at once, and the flight is quite over by 8.50 p.m. The moth can then be seen at rest on grass stems, etc. A few of the local *Stenia punctalis* and a nice varied series of *Miana bicoloria* were taken at the same time.

Sugar was tried on several nights, with good results as far as numbers went, although I was not fortunate enough to take any of the local coast insects I had hoped to get. The best night I had at sugar was July 6th, a hot close night with thunder about, insects were on the sugar in extraordinary numbers. I took the following species at sugar on this and other nights, *Leucania pallens*, *L. impura* and *L. lithargyria*, *Axylis putris*, *Xylophasia lithoxylea*, (abundant), *X. sublustris* (common), *X. rurea* (common), *X. monoglypha* (abundant), *Mamestra brassicae* (common), *Apamea secalis* (*oculea*), *Miana strigilis* (common), *Caradrina morpheus* and *C. alsines*, *Agrotis exclamationis* (abundant), *Triphaena pronuba* (abundant) and *T. orbona*, *Noctua plecta* (common), *Hecatera serena*, *Phlogophora meticulosa* (abundant), *Hadena oleracea* (abundant), and *Plusia gamma*. There is nothing very striking in this short list, but it was well worth the trouble taken, as it was a wonderfully interesting and, to me, uncommon sight to see such a large number of insects at sugar.

Collecting round the gas lamps at night was rather disappointing, although insects of a common order were plentiful enough, nothing really good was seen. *Eupithecia oblongata* was very common at light; this species together with two or three common *Crambi* were seen on almost every lamp. *Bryophila perla* was not so plentiful as I expected to find it. I was particularly anxious to obtain the local form ab. *suffusa*, but only succeeded in taking two examples of this dark variety, intermediate forms were more plentiful. The other insects seen at light were not of any particular interest.

I spent a certain amount of time in searching tree trunks, but was not fortunate enough to take anything of note, the commonest insect to be taken in this manner was *Boarmia gemmaria;* a single *Chloroclystis rectangulata* was taken off an old hawthorn trunk.

The *Pterophorina* are always interesting insects to most collectors. I gave a considerable amount of attention to this group and succeeded in taking the following species :—*Marasmarcha lunaedactyla* (*phaeodactylus*) which was exceedingly abundant among *Ononis;* this species was to be taken in scores by sweeping the net gently over the *Ononis*, the pale ♀ s were rather scarce in comparison with the ♂ s. The beautiful *Capperia* (*Oxyptilus*) *heterodactyla* (*teucrii*) was taken in fair numbers among wood sage, a single *Oxyptilus parvidactyla* was taken in flight at dusk, *Stenoptilia* (*Mimaeseoptilus*) *pterodactyla* was fairly common and in fine fresh condition in woody places, *Leioptilus tephradactyla* was taken in fair numbers at dusk together with a few *Amblyptilia cosmodactyla* (*acanthodactyla*) and *Wheeleria* (*Aciptilia*) *niveidactyla* (*baliodactyla*) and swarms of the common but lovely *Alucita pentadactyla*. One or two *Adaina* (*Leioptilus*) *microdactyla*, in a very worn condition, were beaten out of hemp-agrimony.

I found time too limited to be able to give much attention to "micros," but as it was I took several interesting species, which included *Myelophila cribrum* not uncommon amongst thistle, but getting rather *passé*. Four fine fresh examples of the local *Odontia dentalis*, one of the most beautiful insects we have, were beaten out of viper's bugloss in the late afternoon. This insect has a very short quick flight, it feigns death in the net when taken. *Ebulea verbascalis* were just coming out in the middle of July, two or three examples were taken ; the same remark applies to *Nomophila noctuella*. *Herbula cespitalis* and *Scoparia dubitalis* were abundant everywhere. A single *Scoparia cembrae* was taken at rest on a fence. *Crambus pratellus* and *Scopula ferrugalis* were very much in evidence. A very fresh *Homoeosoma sinuella* was beaten out of rough herbage together with two or three *Phycis ornatella*, one has to be very quick to net the latter insect, as it starts up quickly from under one's feet and makes a headlong dive for the nearest bush. Amongst the *Tortrices*, the best thing taken was *Lozopera francillana*, a single example of which was beaten out of rough herbage. *Retinia pinicolana* was common amongst firs, *Xanthosetia hamana*, mostly rather worn, was common amongst thistles. I was anxious to get the allied *X. zoegana*, but was not very successful, one ♀ only was beaten out of rough herbage on July 10th, several other species of Tortrix more or less common were taken. On July 12th I left Folkestone to return to Abertillery, after a very pleasant and, on the whole, successful holiday.

During the remainder of July I had very little time for collecting, but even if I had it would not have been possible to do much on account of the weather. On the few occasions on which I was able to get out I found insects were very scarce, a few *Pieris brassicae* and *P. rapae* kept company with dilapidated *Epinephele jurtina* and *Coenonympha pamphilus*, *Rumicia phlaeas* and *Adopaea flava* (*thaumas*) were very scarce. I have to record a new locality for *Adopaea lineola*. Looking through some store boxes a few weeks ago I found half-a-dozen *Adopaea lineola* amongst a lot of *A. flava*. These examples were all taken near Bozeat, a small village seven miles from Wellingborough, Northamptonshire, in August 1907. These specimens of mine are undoubted *A. lineola*. I believe this species has been recorded from Barnwell Wold near Oundle, Northamptonshire, which would be about 15 miles from where I took my examples. I very much regret now I did not take a long series, which I could easily have done, as these insects were flitting about a rough grass field in considerable numbers. These Northamptonshire specimens do not differ in any way from others I possess from Essex and North Kent.

A little was done at "sugar" during the latter part of July; insects, which were fairly numerous, included *Leucania impura* (common), *L. pallens*, *Xylophasia rurea* (common), *X. monoglypha* (abundant), *Hadena* (*Mamestra*) *brassicae* (common), *Miana strigilis* (abundant), *Rusina tenebrosa* (common but *passé*), *Agrotis segetum* and *A. exclamationis* (abundant), *Triphaena pronuba* (abundant), *Noctua augur* (fairly common), *N. plecta* and *N. xanthographa* (common), *Phlogophora meticulosa* (abundant), *Euplexia lucipara* (rather scarce), and *Hadena oleracea* (abundant). I did not meet with some *Noctuae* which generally occur here such as *Noctua primulae* (*festiva*), *N. brunnea* and *N. baja*. Searching flowering rushes after dark with a lantern was an absolute failure, on one or two occasions I did not see a single moth. Some years this method of collecting pays well, on a favourable night a hundred moths can be taken without undue exertion. I made a special search for *Noctua ditrapezium*, as I have done for several seasons, but without success, and as only one specimen of this rather rare insect has been taken here during the last seven seasons, I have come to the conclusion its occurrence in this district must be more or less accidental. The Plusias were very scarce, even the usually common *Plusia festucae* was only represented by one or two very dilapidated examples. During July nothing but the very commonest species of Geometer were noticed.

The greater part of August was very wet. When the weather allowed any collecting at all, I found the second brood of *Pieris brassicae*, *P. rapae* and *P. napi* fairly common, especially the latter. *Vanessa io* was common enough, although hardly in its usual numbers, *Pyrameis atalanta* and *P. cardui* were only seen in single examples at a time, not more than half-a-dozen altogether. Only two *Gonepteryx rhamni*, an insect which is usually very common throughout this district, were noticed, a few *Rumicia phlaeas*, *Polyommatus icarus* and *Coenonympha pamphilus* made up the list of butterflies. I did not try any "sugaring" this month, the few moths I collected were mostly netted at dusk, the commonest insect about appears to be *Malenydris* (*Larentia*) *didymata* which, as usual, swarmed amongst the heather and *Noctua exclamationis* was also equally common. *Calymnia trapezina* and *Triphosa dubitata* were not uncommon. Other moths taken are not worth mentioning as they were of no special interest.

On August 8th I visited the small valley where I took *Stilbia anomala* last year. I found this moth was out in its very restricted range in fair numbers and in beautiful condition; a nice series was taken on this date and a few more were collected on the 15th. Two examples of the handsome *Crambus pinellus* were taken this year, which is about my average, although this species occurs throughout the whole district I have never taken more than odd examples at a time, generally late at night. I should like to know if other entomologists have the same experience with *C. pinellus*. Searching heather bloom after dark, with a lantern for *Lygris testata*, *L. populata*, and *L. associata* was very successful. I took these species in considerable numbers, several pairs of *L. testata*, *in cop.*

On August 6th I paid a second visit to Torquay. I started out from Abertillery at 3 a.m. in torrents of rain, but hoped the weather would improve by the time I got to the end of my long journey. It was not actually raining when Torquay was reached, but it was far from an ideal day for collecting. There were a few gleams of sunshine during the day, but for the most part the weather was dull and cloudy with occasional showers. During the bright intervals I netted a few *Pararge egeria*, *Epinephele jurtina* (*ianira*), *Pararge megaera*, *Epinephele tithonus*, *Pyrameis atalanta*, *Rumicia phlaeas*, some fine fresh *Plebeius argus*, and saw but failed to capture two *Colias edusa*. Whilst chasing one of the *C. edusa*, I caught my foot against a length of hidden wire and in falling heavily caught my head against a large stone which "laid me out" for a few minutes, however nothing more serious than a severe headache for the rest of the day resulted. Beating bushes for Geometers was very wet work and not very productive, a few *Xanthorhoë* (*Melanippe*) *fluctuata*, *Acidalia aversata* and other common Geometers were netted, together with several *Scopula ferrugalis* which was very common. A couple of *Aspilates gilvaria* were disturbed out of rough grass, also a fine fresh *Agrotis puta*, a rather worn *Endotricha flammealis* and one or two *Stenoptilia pterodactyla*. *Nemophila noctuella* in a decidedly *passé* condition was very common on some rough broken ground between Torquay and Babbacombe. A single full-fed larva of *Pyrameis cardui* was found on a hollyhock mallow, surely rather an unusual foodplant. This larva produced a fine ♀ on August 28th.

At the end of the month I devoted one or two afternoons to the common but variable *Dictyopteryx contaminana*. Large numbers of this little *Tortrix* were beaten out of whitethorn. I was particularly struck with the fact that the typical form with bright straw ground-colour was almost entirely confined to low elevations, at the top of the hills, which rise about 500 feet above the valleys, the common forms of this species were the vars. *ciliana* and *rhombana* with dark ferruginous ground colour. The small stunted weather-beaten whitethorn in exposed situations gave this species in the greatest numbers, a sharp kick on the main stem of a whitethorn resulted in a little cloud of these insects.

The frightful weather we had during September put a stop to all collecting, except in the last day or two, when a few *Polia chi* were taken at rest on the stone walls, nothing else of any interest was noted throughout the whole month.

On September 24th I went down to Bickley, Kent, for a few days. Searching fences gave a few moths, the commonest of which were *Luperina testacea*, a couple of *Ennomos alniaria* (*tiliaria*), and a few *Acidalia virgularia* were taken on the 23rd, several *Acidalia marginepunctata*, and a single *Thera juniperata* were taken on the 25th together with a few more *Acidalia virgularia*.

A few of the common autumnal insects were met with during

October, the best things taken were a few nice forms of *Tapinostola rufa*, which were not uncommon amongst rushes. *Oporabia dilutata* this year was not so common as usual. After the middle of October further collecting was quite out of the question.

Taking the season throughout, the most striking difference between this and an ordinary year was the scarcity of butterflies, which I suppose can be accounted for by the absence of sunshine, and the comparative scarcity of common insects which in normal seasons occur in profusion. However in spite of the season I have been able to add seven new species to our local list, viz :—*Eumorpha elpenor*, *Hadena genistae*, *Xylophasia lithoxylea*, *Bombycia viminalis*, *Hepialus lupulina*, *Malenydris salicata*, and *Botys hyalinalis*.

Protective Resemblance.

By C. W. COLTHRUP.

In Mr. Parkinson Curtis' reply to my note on the above subject (*Ent. Rec.*, vol. xxiv., page 57), I note incidentally that he changes the title to "Coloration Problems." Evidently he is not greatly enamoured of the term "Protective Resemblance," as is evidenced by his remarks, "*incomplete and in some ways misleading*," with which I agree. If I were tempted to alter the title I should add to it "Mimicry and Warning Coloration," but have not done so because I hold that each of these terms is best dealt with separately to avoid confusing the issue, although, in replying to his remarks in the order in which they appear in his paper, I am bound to make reference to them. In the first place I am pleased to note he admits that the attacks by Lt.-Col. Manders and myself have shown some weak spots in the arguments deduced in favour of the theory, and that in some respects the evidence is slender or negative.

I should like to point out that not only should there be "logic in the laboratory or museum," but also in "examples fresh from the field," and I must say I fail to follow his logic when he doubts the ability of the British Marsh Tit to see a moth when looking for his breakfast, and later on says that "*Tits rely entirely on the eye . . . such a scrutiny that one would almost think the most perfect cryptic coloration would fail to defy it.*" I am afraid Mr. Curtis has not read my note as carefully as he might have done, otherwise he would not father me with the "bad photographic test." If he will refer to my note again, and to the note, *Ent. Rec.*, vol. xxiv., page 76, to which I refer, he will see that my point was that "a photograph was a very bad test of resemblance to surroundings," so that his remarks on the photographic plate only confirm what I had already written.

With regard to the "elusive collar stud and forceps," I mentioned these ironically to show that it does not follow because an object is difficult to see, although bearing no resemblance to its surroundings, it is therefore a case of "protective resemblance." As an instance of the "confusion of the thought, etc.," which he refers to in connection with the above, I would cite Mr. Russell James, Junr's. note (*Ent. Rec.*, vol. xxiv., p. 306) re *Camptogramma fluviata*, where he states that the moth closely resembled the broken "blisters."

With regard Mr. Curtis's remarks "Cryptic colouring as it becomes more perfected *takes on* in some degree the normal colouring, chequered or otherwise, of the surroundings," can he explain the meaning of *takes on*, and by what means this is accomplished? It is quite certain the attacks of birds cannot introduce the colour of the surroundings. Again he says "*variegation of color alone tends to inconspicuousness, quite apart from whether the colors and surroundings match or not*," then why call every instance of this "protective resemblance?" In support of the above, I remember once finding a clutch of Lesser Tern's eggs on the beach, one of which was white. Returning later in the day to photograph it, I found the clutch as difficult to discover as one of normally coloured eggs, although I had marked the spot pretty well. On another occasion I found by accident four eggs of the Ringed Plover on a mudflat, quite away from any beach, and *unlike their surroundings*, yet on returning later to photograph them, I was surprised to find them as difficult to discover as on the shingle where they are supposed to be so wonderfully "protected." I shall have occasion to refer later on to these eggs on the beach, Mr. Curtis says it is beyond his imagination entirely how Cryptic Coloration ever arrived at its present perfection, if it does not serve as a means of escaping attacks at rest, and offers a contradiction when he casts a doubt as to whether "a utility to its possessor be necessary at all." I am inclined to agree with the latter remark. Of what use are the beautiful (to human beings) markings on lichens, leaves, flowers, etc., the beautiful colour and markings of some stones, the varied shapes of leaves, the colour and stripes on the hedge snails *Helix hortensis* and *H. nemoralis*, the sculpturing on the eggs of a number of moths and butterflies (the colour and pattern often present on the former), the sculpturing on some seeds, some of which by the way are very like the eggs of moths and butterflies? Is this claimed as mimicry too? Mr. Curtis misrepresents me with regard to *Biston hirtaria* on tree trunks. I did not say that they were attacked in the daytime; they were not, but at twilight; but even if they were, the spider on the trunk would be on the same plane and would view the moth end on, when the cryptic resemblance (if present) would be of no use. There is no doubt that movement at dusk was fatal. I note Mr. Curtis gives instances of attacks by a centipede and beetle on *Tortrix ribeana* and *Xylophasia monoglypha* (*polyodon*), and admits that it was at night and the moths moving. As records of the fact these are alright, they do not help "protective resemblance" however. Mr. Curtis must not confuse the issue. In my original note I referred to moths *at rest*. He demurs to my limiting the discussion on "protective resemblance" to moths. I can quite understand this because he must know that the surest and best way to attack the theory is to do so piecemeal, to avoid confusing the issue by endeavouring to cover too much of the subject at once. I can assure him that it was not because I had no evidence against the theory in other orders of insects, birds, etc. Incidentally I may mention that Ringed Plover and Tern's eggs on the beach, and Lapwings on the beach and marshes are supposed to be good examples of "protective resemblance," yet they are quite easily found by their enemies—the Gulls, Crows, etc. The Lapwing's eggs on the green grass of the marsh being no easier to find than on the beach, to a human being. If there is any value in this "protective resemblance," how is it that Redshanks and Snipes, which belong to the same family, and lay similarly coloured and marked eggs, have so little faith in it that they hide their eggs in tufts of grass, and in the case of the former when nesting on the beach lays its eggs in the centre of a sloe bush? Since writing the above I happened to be reading *Field and Hedgerow*, by Richard Jeffries, a very careful observer, and I find he comes to the same conclusion with regard to the supposed "protective resemblance" of shore birds' eggs, and has a very interesting chapter, pages 251-254, on the above subject; his remarks strike me as practical and full of common sense. I once found a Wren's nest built where tree trunks, branches, fences, posts, etc., were covered with lichen, and the birds had used the lichen to cover their nest. What marvellous instinct and what a splendid case of "protective resemblance," says someone. Yet it is already discovered by a mere human being, and is much more easily found by its natural enemies. The birds had simply taken the materials to hand as does another bird that uses pieces of paper strewn in a paperchase, the nest thus being most conspicuous. A case is on record of a bird's nest in India being made of wire from lemonade, etc., bottles.

Mr. Curtis misquotes me and fathers me with a "bloomer." He says, "Mr. Colthrup surmises that birds rely on their beaks when looking for insects." He leaves out the word "also" before rely, and quite overlooks the fact that I was speaking of Tits only, thus making it appear that I was speaking of birds generally. I should have treated this as a clerical error, but for the fact that he is at pains to show that various birds rely "on eye." Of course they do, surely no one doubts that. Mr. Curtis corrects me, and says that Tits do not search tree trunks. In this he is quite wrong. I have often watched them go carefully all over rough tree trunks both in the open and in my garden, where two old oak trunks are a regular hunting ground for Cole and Blue Tits, whereas the Robin confines his operations to quite near the ground, or only where some ivy gives him a foothold.

With regard to the beak of the Tit, it is a far more useful and deadly instrument than Mr. Curtis appears to think. Recently I watched, at close quarters, a Great Tit endeavouring to crack a very hard seed with its beak, which it eventually succeeded in doing. It held the seed between its feet, and the noise it made as it delivered blow after blow in quick succession, was nearly equal to that made by a Woodpecker. I once saw a Tit at work on a tree trunk, and on going to investigate, found it had cleaned out the contents of a "kitten" cocoon—another dig at "protective resemblance"—as exemplified by the cocoon. The Great Tit also has the vicious habit of attacking birds about its own size, and with repeated blows on the skull of the unfortunate victim, it succeeds in smashing it, and then devours the brains. So much for the beak. With regard to his remark on the Tit's eye, "*such a scrutiny that one would almost think that the most perfect cryptic coloration would fail to defy it*," I quite agree and—exit "*protective resemblance*."

With regard to his query as to whether Lieut.-Col. Manders and myself understand the psychology of the birds themselves, answering for myself I should say that I imagine I know as much of the psychology of birds as Mr. Curtis knows of the psychology of insects, but I fail to see what bearing his remarks on the British Marsh Tit (*Parus palustris* var. *dresseri*) have on the point. I still maintain that the published records of the attacks of birds on moths on tree trunks, or in undergrowth, or on butterflies *when at rest*, are quite infinitesimal, when the enormous number of these insects, and the often quite local occurrence of many is taken into consideration, and do not warrant the assumption that the cryptic coloration is the result of the weeding out by such attacks.

(*To be continued.*)

Some Notes on the Early Stages of Cemiostoma laburnella.

By ALFRED SICH, F.E.S.

In the late summer of 1908 I noticed that there was a plentiful supply of material for the study of the life cycle of the beautiful Tineid moth, *Cemiostoma laburnella*, on, in and about a small laburnum tree in the garden at Chiswick. I therefore took the opportunity of finding out some details connected with the economy of this species, and the notes on the observations I then made and have made since, form the basis of this paper.

The milky-grey egg is laid on the underside of the leaf of the laburnum, and the larva on hatching eats its way through the base of the egg-shell into the interior of the leaf. Once in the leaf it mines spirally towards the upper surface until it lies just below the upper cuticle of the leaf. This first part of the mine shows as a reddish-brown blotch about 1mm. in diameter and is visible on both sides of the leaf. On the underside of the leaf, usually in the centre of this blotch, lies the vacated egg-shell. This is only partly filled with excrement and appears in certain angles of light as a speck of gold-dust. The larva, in its first instar, is now not quite 1mm. in length. The prothorax is wide and swollen and acts, I think, as a thrusting-block to the head when the larva is feeding. The body is pale grey with the canal yellowish-green. There are neither legs nor prolegs and the little caterpillar lies perfectly helpless when taken from the mine. When the larva has completed this small blotch it lies up for the first change of skin. After this is accomplished the larva, now in its second instar, commences a narrow gallery mine which runs right away from the blotch usually to a distance of 4mm. This gallery, but for a slender line on each side, is filled with black excrement.

The larva in this stage is much like that in the first instar, but the thorax is not swollen. There are traces of the foot-like pads on the thoracic segments, but the larva is quite inactive. At the end of the gallery the larva prepares for the second change of skin, hiding itself partly under the excrement, its head lying at about 1mm. from the end of the mine. On the prothorax there is a conspicuous dark spot. The larva mines dorsum uppermost. After this change the larva, now in the third instar, shows that it has somewhat developed; the pads on the thoracic segments are now furnished with claws and there are four pairs of prolegs, those on the fourth and fifth abdominal segments being stronger than the other two pairs. These two middle pairs are so strong that the larva can stand on them alone and elevate the anterior and posterior portions of the body. This feat also shows that its muscles are well developed. The larva now mines right and left from the end of the gallery until it has eaten out a round patch of the parenchyma, of a diameter of 6mm. This patch is filled with black excrement, except a pale yellow line which runs about half-way round the outer edge. This is where the larva lies until it has assumed its fourth instar. The change of skin successfully completed, the larva soon recommences to mine. It now begins to form that part of the mine which later becomes the conspicuous pale brown patch that so disfigures the leaves when a laburnum tree has been badly attacked by this species. The regular mine, up to this stage, consists, as we have seen, firstly of a minute dark spot, secondly of a short gallery, and thirdly of a larger more or less circular blotch, the three portions together, in outline only, reminding the observer of a balloon with the car attached at a further distance from the envelope than usual. But, of course, the mine is perfectly flat, and remains flat till completed. Each portion of the mine corresponds with one stadium of the larva. When the larva in the balloon-like portion of the mine has changed its skin and assumed the fourth and last instar, it commences mining on a larger scale, and its tracks form a series of arcs. In the more regular mines, in cases where the egg was laid towards the base of the leaflet, the larva makes a continuous progress right up to the apex of the leaflet, usually keeping one side of the mid-rib, and consuming all the parenchyma contained in the upper half of the space bounded by the mid-rib and the margin of the leaflet. But many mines are not so favourably situated, and the larva, in order to obtain its full amount of nourishment, has to mine the leaf on both sides of the mid-rib. In most cases the last part of the mine so involves the earlier portions that they become lost to view, or difficult to make out. This last part of the mine often measures a length of 30mm. with an average breadth of, say, 7mm. When the larva, in its first instar, has once reached the upper surface of the leaf, it mines dorsum uppermost, and continues in this position till the mine is completed. The upper cuticle of the leaf, which the larva separates during the process of mining, is fairly transparent, and the larva would be easily seen in the mine but for the fact that it deposits almost all of its excrement on this upper cuticle. The excrement is at first green, but in a few hours becomes black and effectually hides the caterpillar. In the last part of the mine, the larva, when feeding, usually lies in a semicircle, with its head at the circumference of the mine, where it bites away at the parenchyma; its tail is also near the margin of the mine. The anus is turned upwards in order to place the pellet of excrement on the upper cuticle. Hence, as the larva mines out a line from one side of the mine to the other, like the swath cut by a scythe, this line is followed, a little distance behind, by a line of excrement, and thus the last part of the mine is characterised by a number of black arcs running across it.

The larva in this fourth or last stadium is of a pale waxy grey with a broad dark green band on the dorsum of the abdominal segments. The prothoracic shield is dark grey, divided by a pale line, the usual tubercles and setæ are present, and there is an abundance of short pile. The larva is very active when taken out of the mine and usually spins a thread of silk as it crawls. If annoyed it wriggles. When the larva is full fed, it remains for a certain time in its mine until it has lost the broad green dorsal stripe. It then cuts a slit in the upper cuticle and leaves its mine for ever. I was fortunate one morning in seeing a larva, which had left its mine, crawl down the leaf stalk on to the twig and from the twig to the branch, from the branch to the main stem and so down the main stem to the ground. This was in September and most of the larvæ of the second brood which came under my notice did likewise, or attempted to do so. On the other hand most of the larvæ of the early brood appeared to spin up on the leaflets.

The cocoon and the method of its preparation are both highly worthy of attention. It is one of those which have sometimes been called hammock cocoons, as the real cocoon is not fastened to the foundation on which it is built (as, for instance, that of *Dicranura vinula*) but is swung between strands of silk. When the larva has selected the situation in which to form its cocoon, it commences by spinning a number of strands of silk, not around itself as most larvæ do, but only on two sides of itself. After a short time, the larva is seen in the centre between two parallel walls of silk. It remains in the centre while spinning, but faces one wall at a time, and stretches its head to the right and left as it passes the strand of silk from one to the other end of the wall. After a time it will turn round and face the opposite wall, adding silk to that in the same way. This action, with frequent rests, is continued for five or six hours, when the walls are nearly completed. In a well made cocoon the walls will be about 12mm. long and 2mm. high and 1mm. apart at the top. These walls are not perpendicular. One approaches that position and the other leans greatly towards the opening between them. The leaning wall is necessarily the larger and on the top of this wall the larva spins a number of loose fluffy threads which partly hang over the top of the wall. No such threads are spun on the other wall. At the bottom between the walls the cocoon proper is spun. This is spindle shaped and not much more than half the length of the walls. It is frequently spun almost into the base of one of the walls. Though the whereabouts of the pupa can be seen through the cocoon, the latter is rather closely woven and moderately tough, though soft. When these larvæ spin up on the leaflets of the laburnum, the walls of silk draw the leaflet into a curve, like the string does a bow, so that a convenient space is formed in which the cocoon proper can be spun. I have noticed that the cocoons spun on the leaves in June are often rather poor structures compared with the elaborate cocoons spun in Autumn. Pupation takes place three or four days after the completion of the cocoon and the larval head-shell and skin are usually thrust out of the cocoon proper.

The pupa is a very singular one, very flat and covered with striæ or minute ridges, running over the limb-cases. The limbs come down almost to the end of the body. The eye-caps at the bases of the antennæ are very conspicuous. There appears to be no cremaster for anchoring the pupa to the cocoon; I presume the transverse ridges on the limb-cases help to retain the pupal shell in the cocoon when the moth escapes, as the pupa-case is left in the cocoon when the moth emerges.

The beautiful imagines of *Cemiostoma laburnella* may often be seen in abundance in May and again in August in the close neighbourhood of laburnum trees. They are fond of resting on the leaves and fly out of the foliage, when that is disturbed, like a crowd of minute snow flakes. I think the period during which the imagines of either brood are on the wing lasts about six weeks. As far as my observations go I know there are two distinct broods in Chiswick, the moths occurring in May and again, generally much more numerously, in August, while the larvæ may be found in June, July and again in September. I think it quite possible that from the end of April till the beginning of October imagines might be taken on the wing and that full fed larvæ might be found any time from June till November, but I cannot consider this species as being continuously brooded during the summer, as some have suggested. I think that the last stragglers of the first brood are sometimes overtaken by the forwards of the second brood, and the two following facts seem to point distinctly to the truth of there being only two broods during the year; firstly, there are two periods in the year when the imagines, on the one hand, and, two periods when the larvæ on the other, are abundant, and secondly, that between these periods of abundance the imagines and the larvæ respectively are very scarce.

Hibernation takes place in the pupal stage, thus this species differs in this respect from its very close ally, *C. spartifoliella*, which passes the winter as a larva, and which has only a single brood in the year.

To me one of the most interesting observations I made on *C. laburnella*, was that with regard to the supposed habit of the larva of letting itself down from the trees when ready to spin its cocoon. I have already stated that the full fed larva of the autumn brood after leaving its mine, crawls down the stem of the tree. In so doing, it would doubtlessly spin up in any suitable situation on the bark that it might find. If no such situation is found, the larva wanders over the ground below the tree. Instead of making a long peregrination over the branches and down the trunk of the tree, how much more simple, how much less laborious it would be for the larva to lower itself, by means of a thread of silk, straight as a plumb line to the earth! Therefore, because this seems so natural and so plausible, we think we have seen the larvæ letting themselves down in hundreds. We have certainly seen hundreds of larvæ actually hanging by threads, we have seen many actually let themselves down off the tree. They do not however take this action voluntarily. It is the force of circumstances that compels them to do so. When we see them hanging by threads we shall, if we closely examine them without scaring them, discover, not that they are letting themselves down, but that they are all actually trying to get up, to regain the position from which they have fallen. I first noticed this on September 20th, 1908, when I saw six larvæ hanging on threads and found that they were all trying to ascend, and that they had little balls of silk between their thoracic legs, showing how they rolled up the silk as they reascended. I then saw some larvæ fall suddenly off the branches and hang by a thread about a foot long, but after a short time they also began climbing up again. By a sudden side movement of the head and thorax, the larva is able by means of the thoracic legs to gather up the thread, and so regain the position from which it fell. As the larva is so small and the action so rapid, I cannot yet say exactly how the thread is caught up, though I have attempted to settle this point by aid of a lens on very many occasions. In order to see why the larvæ let themselves fall, I carefully watched various individuals as they crawled down the tree, and I noticed that when they came to a branch, having a horizontal direction of growth, the larvæ generally crawled along the lower side of the branch, and on one occasion I actually saw a larva fall from the smooth bark. It fell only to a depth of about half its own length and very soon pulled itself up again and recommenced its journey. This I have come to look on as absolutely a mere accident, but it was curious that I should first observe a larva fall in this way. The next thing I noticed was that there were a number of ants running over the trunk and branches of the tree. I soon found two ants descending the trunk, each carrying a larva of *C. laburnella* in its jaws. Later I saw a third ant seize a larva as it was crawling down the trunk, and the larva wriggled much while being carried away. I then turned to a branch of the tree and and watched both ants and larvæ. I several times saw the ants run very close to the larvæ and the latter took no notice of them nor did the ants seem to be aware of the larvæ until they were almost in contact with them. At last I saw an ant actually come in contact with a larva and the larva instantly dropped off the branch and fell to a depth of about a foot. There it hung for a short time and then began winding itself up again. I have not the slightest doubt that the larvæ I had previously noticed falling from the tree to about a foot's depth had also been attacked or irritated by ants. On the other hand there is no doubt in my mind that scores of these larvæ do reach the earth hanging on their threads. I have seen them do so. The process of winding themselves up again when they have once fallen a foot or more occupies a very long time and must be tedious to the larva. They frequently make a second fall while ascending, but whether this is owing to the fatigue, or to an accident in the winding, I cannot say. I fancy that after a second fall they rarely, if ever, regain the tree, and therefore sooner or later fall to the earth. When there is a breeze blowing the larvæ sway about on their threads and of course often get entangled with the threads of other larvæ. That the larvæ reach the earth by descending on threads of their own silk is perfectly true, but I maintain that this is not a premeditated action, that it is not done without some kind of compulsion, that it is always accidental, that is to say that the larva does not descend from its own subjective idea, but on account of some objective interference with its natural procedure. I captured some of the ants I have mentioned and sent them to Mr. A. H. Hamm, who kindly identified them as *Lasius niger*, L., a common species in most gardens. Since 1908 I have noticed larvæ of various species, especially those of the *Geometrina*, hanging by threads, and they were always likewise trying to ascend. But of course many of these larvæ were not full fed and were trying to get back to the food. Such, however, is never, I believe, the case with *C. laburnella*, as they do not leave the mine till they are full fed. Many leaf-mining larvæ have the power of moving from one leaf and making a fresh mine in another leaf, but the larvæ of *C. laburnella* do not appear to have this power. After having taken larvæ out of their mines, I could never induce one to enter another leaf.

The leaves of the laburnum are composed of three leaflets, and each leaflet is usually large enough to support two or even three larvæ of *C. laburnella*, but when this species is very abundant, many of the leaflets have so many eggs on them that there is little chance of any larvæ maturing. On September 3rd, 1908, I found at Cookham one leaflet with 22, another with 38, and a third with 40 mines. I should say that in these cases none of the larvæ would reach the fourth stadium, they would all previously die of starvation. Thus, when this species becomes excessively numerous, the females are prone to lay too many eggs on the favoured leaflets, and so, by causing the death of many larvæ, to assist in maintaining the proper balance of individuals.

Most authors place the genera *Cemiostoma* and *Phyllocnistis* in very close proximity. However near to each other their ancestors may have been in remote ages, they have become now, if my judgment be correct, widely separated. They are both highly developed genera, but they have developed on different lines. I think the feature of greatest contrast is shown in the pupa. In *Cemiostoma* the pupa may perhaps be said to be armed with transverse ridges, and probably the ridges help to retain the pupa in the cocoon. In *Phyllocnistis* the pupa is of quite a different form, and is most elaborately armed with spines and bristles to aid it to force its way out of the cocoon. *Cemiostoma* may be near *Lyonetia*, but if we retain it in the family *Lyonetiidae*, we must remove *Phyllocnistis*, which, in my opinion, rather belongs to the *Gracilariidae*. When I first began to observe *Cemiostoma laburnella*, I looked for points of relationship with *Phyllocnistis*, as most of the authorities place these two genera close together. However, I soon found that my quest met with no encouragement, and that the species I had under observation had apparently no kinship with the insect which so delighted me some years ago.

OVUM :—The egg is of peculiar shape, somewhat resembling a pie-dish with the pie in it. This seems to be a shape common to the genus, at least the ova of *C. spartifoliella* and *C. lotella* agree with *C. laburnella* in this respect. In profile the outline of the egg rises slightly above the periphery, while below that area it slopes inwardly down to the base. The long axis measures 0·25mm., the shorter 0·2mm., and the height 0·06mm. The sculpture consists of slight irregular pentagonal network, which appears on the upper surface only. The colour is milky grey.

LARVA :—*First instar.* Length 0·6mm., width of head 0·1mm. The head is large but the jaws are not prominent. The prothorax is twice the width of the head, the mesothorax rather narrower than the prothorax, and the metathorax very narrow. The body is fairly cylindrical, but the ninth and tenth segments are abruptly narrower. There are no legs or prolegs and no visible tubercles, even under an eighth objective. The usual head marks are pale brown, and the body is pale grey with a yellow central band running down the abdomen.

LARVA :—*Second instar.* Length 1·2mm., width of head 0·17mm. Somewhat like the larva in first instar but the thorax not so much swollen in proportion. There are traces of the ball-like pads below the meso- and metathorax. On the dorsum of the prothorax there is a somewhat quadrangular dark brown patch. The larva mines dorsum uppermost.

LARVA :—*Third instar.* Length 2·8mm., width of head 0·3mm. Head and thorax rather flattened, body more cylindrical. Segmental divisions very well marked. The ball-like pads on the mesothorax, the metathorax, and a smaller one on the prothorax are furnished with a claw which is probably the terminal joint of the true thoracic legs, the other joints being hidden in the pads. There are four pairs of abdominal prolegs, all without crotchets. The pairs on the fourth and fifth segments are very well developed as already described. The anal claspers are rudimentary. The setæ are well developed and placed on strong simple tubercles. The tubercles are much in their usual positions except i, which is placed further from the mediodorsal line than ii. This strikes one as being peculiar, but this position of i is found in other microlepidopterous larvæ. There are a large number of skin hairs or pile. The thoracic shield is dark brown but undivided. The body is shining pale grey with a pale green mediodorsal stripe.

Larva :—*Fourth instar.* Length 6mm. Width of head 0·4mm. The larva in shape is much the same as in the 3rd instar, but it is much more active and crawls rapidly about. The head is light brown. The prothoracic shield is dark grey divided medially by the paler band. The body is pale yellowish waxy grey. A broad green band runs dorsally from the mesothorax to the sixth abdominal segment. The tubercles are the same as in 3rd instar. Tubercle iv carries a long bristle, but both tubercle and seta are quite normal, not in the least like iv in *Cemiostoma scitella.* The abdominal prolegs carry a single circle of from 14-15 black crotchets, while the anal claspers bear about 17 crotchets arranged in the usual horse-shoe manner.

Pupa :—The pupa is very flat. The limb-cases reach almost to the end of the body. They are all strongly transversely wrinkled. The antennal eye-caps are very conspicuous. There appears to be no armament of bristles nor any cremaster.

The Coloration Problem. A Rejoinder.

By Rev. G. WHEELER, M.A., F.Z.S., F.E.S.

When I first read Mr. W. Parkinson Curtis's article, as published in the last number of the *Ent. Record*, it was already in type, and it was too late, without unduly embarrassing the Editorial Secretary, to do anything more than append a foot-note (see p. 156), the expressions in which it is now incumbent on me to justify, more particularly since I find that Mr. Curtis acted under an entire misapprehension as to the purpose of my correspondence with him. I cannot imagine how this misapprehension arose, but of course I do not suppose that he had any *intention* of treating me unfairly, and am sure that he felt himself justified in the course which he adopted. That my letter to which reference was made has never been published is an undisputed fact; that I did not intend it to be replied to in any publication I thought Mr. Curtis would infer from the fact that it was admittedly both incomplete and hurried. In the first paragraph the following sentence occurs :—" Even now I am only able to treat it in the most cursory way, and not at all with the thoroughness that the subject and your treatment of it deserve. Please forgive me if I 'rush' a few points and leave others alone." There were also in my letter other matters which made it impossible to publish it as it stood, a view in which Mr. Curtis entirely concurs. My letter then was not merely unpublished, but I thought obviously "never intended for publication." Mr. Curtis however supposed that he was expected to answer it in his article, on account of the circumstances under which the correspondence arose, and of which he has asked me to give some account. In September last the Editorial Secretary sent me Mr. Curtis's original article, and as I knew that important papers bearing on the subject would appear in the *Transactions* (*and Proceedings*) *of the Entological Society* before the article in question could possibly appear in our Magazine, I informed the author of this fact, and asked him whether he would prefer to read these papers before publishing his own, as they might modify his views and cause him to re-consider some parts of his paper. At the same time I took occasion to point out certain fallacies, as they appeared to me, in the arguments by which some of his views were supported. The paper as a whole seemed to me so valuable and important, that I wished the writer to have every opportunity of making it as perfect as possible, and as he had not been present at certain meetings of the Entomological Society he had no possible means of knowing that these papers were about to appear. I am carrying out his wishes in stating that as a matter of fact he did modify his article in certain directions, in consequence both of the publications of the Entomological Society to which I had referred him, and of the observations I made in my first letter in September, and more fully in that of October 31st, which is now more particularly in question. Of course if he had simply referred to the correspondence from this point of view I could have had no objection, but he appears to me to have singled out only those points in it which he wished to dispute. This however is a matter which any reader can decide for himself.

I have Mr. Curtis's own authority for stating that what he wrote was that he regarded my views expressed in the *Entomologist* as being "sound" (not "unsound," as erroneously printed), and the point of my argument there is just that of his next paragraph, namely, that the soundness of a theory ought not to be tested by its inapplicability to certain cases. I do not see how anyone could read Mr. Curtis's last paragraph on p. 156 and not feel confident that I had expressed adherence to an entirely opposite theory. Again, the whole reference to my opinions certainly appears to me to place me among the opponents of the theory of Mimicry, while in point of fact I merely think it a pity that a theory which is of great value, and the best working hypothesis yet propounded, should so often be made to appear ridiculous by being stretched to cover cases to which it is quite inapplicable. Again the author of the paper writes:—"Mr. Wheeler suggests that the theories might be applied where almost demonstrably applicable, but rejected in other cases." What I wrote was:—"It is at least possible that protective resemblance may be extremely useful and mimicry an actual fact in some cases, or at some stages, but not in others. It is surely quite logical to accept it in some instances in which it is almost demonstrably true, and to reject it in others *in which it is almost demonstrably false*." Here, I submit, my views have been 'caricatured.' It would doubtless have been better if for 'true' and 'false' I had written 'applicable' and 'inapplicable,' but that my meaning was grasped by the author is evident from his use of the word 'applicable' above. Again:—"I cannot follow Mr. Wheeler in his suggestion that the theories may apply to one Order and need not necessarily apply to another." I wrote:—"It might easily be true (*though I don't think it is so*) that Mimicry was a perfectly good and sound theory applied to some parts of the animal kingdom but not to others—not to the Lepidoptera for example—but I believe it would be much truer to say that it often applies to many Orders, including the Lepidoptera, especially in the larval stage, but that it is stretched by its advocates to cover countless cases with which it has nothing to do."

In this case I consider that any reader might suppose my views to be the exact opposite of what I had declared them to be, though, had the original letter been before the readers of the magazine, I should not have complained, as it would then have been obvious to them that the "suggestion" was one with which I did not agree. The above include the whole of Mr. Curtis's references to my letter (as well as to the *obiter dicta* in my article in the *Entomologist*), and I submit that there is not a single instance in which my expressed views are not to some extent misrepresented, and that the expressions used in the last line of my foot-note to his article were fully justified. I must plead guilty to a confusion in expression, but not in thought, between the *truth* and the *applicability* of the theory of mimicry. This confusion I should never have allowed to appear in print, which makes me all the more regret that a "hurried" letter has been treated as if it were a carefully thought-out and published expression of opinion. I thought at first that Mr. Curtis had been betrayed into the same confusion, but he appears in reality to make the universality of a theory's applicability the test of its value! (*i.e.*, presumably of its truth), for he writes:—"The theories would lose their value to me entirely, if they could not be applied *throughout* (the italics are mine), and to their logical extremity." At any rate they would not lose their *intrinsic* value because they are not universally applicable, which is fortunate, since there is probably not another individual among the advocates of the Mimicry theory, who would make such apparently uncompromising claims for it; unless I misunderstand him it certainly seems a case of "save us from our friends." I will give an example of what has deceptively the outward appearance of a syncryptic group caused by Müllerian mimicry. In is well known that the darkest forms of many grey moths of widely different genera are now by far the commonest in and around London, and that the area in which this takes place is enlarging itself almost annually. Is it seriously contended that this is to be accounted for, as might seem on the surface to be the case, by Müllerian mimicry, instead of being one of the most obvious and easily understood instances of the working of natural selection by means of protective resemblance? It may, and I think does, show something of how mimicry works, and even arises, but there has been no time within the last 25 years for the formation of a syncryptic association between these various species, to say nothing of the fact that they are not all out at the same time of year. Again, the same result has been brought about in several *damp* localties elsewhere in England by totally different causes but by the same mechanical means, *viz.*, an increase in the number of dark scales and a diminution in the number of light ones, the precise opposite of the law for which Mr. Curtis *seems* to contend on p. 157, though I greatly doubt whether at bottom there is any considerable difference between his views and mine on this particular matter.

In my letter occurred the following paragraph:—"There is no argument more illogical than one which is in constant use, *viz.*, that you can only disprove one theory by supplying another in its place and proving the latter true. This argument is often so wrapped up that it seems not to have occurred to the writer that it is really the essence of the argument after all." Mr. Curtis has "no love for" this method of argument, yet he employs it quite openly in the last paragraph of p. 157, and somewhat more covertly at the end of the preceding paragraph, when he pronounces against Col. Manders' attitude of neutrality; yet surely it would be difficult to find a case in which this argument is less applicable; for Col. Manders' attitude, if I understand it rightly, is not merely permissible, but is actually the *only* scientific one in every matter which is not practically proved, and is known as the attitude of "Scientific Scepticism." [By the way, if the contention that a theory must be universally applicable is tenable, Mr. Curtis would be justified in supposing that I must necessarily be an advocate of Religious Scepticism also, which in point of fact, I hold to be the most unscientific attitude in existence.] It is the bounden duty of every scientific man to keep an open mind until a theory is proved (not mathematically however, which is impossible outside pure mathematics), and it is quite illogical to regard him as necessarily an opponent because he does so. I should define my own position on the subject as a very friendly neutrality, and possibly Col. Manders' might be defined as an "armed neutrality," though I would not presume to speak positively upon that point.

Of the immense value of the observations detailed in Mr. Parkinson Curtis's paper it is needless to speak, and not less valuable are his arguments as to the utility of experiments made with regard to the palatability of insects in the case of domesticated birds; I shall hope on a later occasion to make a few comments on some of these points, mainly with the view of trying to add in some slight degree to the practical value of future experiments of the kind.

Neuraphes nigrescens, Reitt., Verh. zool.-bot. Ges. Wien, 1881, p. 566. A Species of Coleoptera new to Britain.

By H. St. J. K. DONISTHORPE, F.Z.S., F.E.S.

"Like *N. sparshalli*, and coming near to it, peach-black, the thorax, shoulders, and the apex of the elytra sometimes dark red brown, the antennæ and legs rust-red, the palpi yellowish, the forehead very distinctly punctured, the thorax, as in *N. sparshalli*, but before the base with a small central puncture, sometimes also with a very fine short central furrow, the elytra of the same outline as in *N. sparshalli*, on the whole a little more strongly punctured. Long, 1mm." On comparing my specimens of *N. sparshalli* with some taken recently on Lundy Isle, I was struck by the fact that two specimens had distinct central furrows on the thorax, and, moreover, looked a little different. These were both found to have been taken at Wicken Fen, September 16th, 1909, and March 19th, 1910, in sedge refuse. They agree very well with Reitter's description, as they possess both the central puncture as well as the central furrow in the thorax. The forehead also is distinctly punctured, more so than in any of my *N. sparshalli*. Ganglbauer, in his table, separates *nigrescens* and *sulcatulus*, Fairm., by the central furrow, etc., in the thorax. In the latter the head is weakly punctured. In my specimens the elytra seem to be a little broader in proportion to the thorax than in *sparshalli*. With such nearly allied species, however, it seems best to regard them as *nigrescens*, rather than to make a new species.

Further Notes on Libythea celtis. (*With five plates.*)

By T. A. CHAPMAN, M.D.

In the last Volume of the *Ent. Record* (xxiv., p. 302) I gave a short account of the egg and oviposition of *Libythea celtis*: as I have a few notes and specimens of the larva, it may be useful to say something of these.

Eggs laid on April 17th hatched on the 23rd. The newly-hatched larva is pale grey with some brown tints on the head. In the 2nd instar the head is nearly black and the rest of the larva is of a neutral grey tint and looks quite hairy (the hairs being aggregated, of course, just after moult). When full-grown in this instar it is 5mm. long, with black head, a pale slatey body, with a paler dorsal line and a paler, nearly white, lateral (subspiracular) line, reminding one much of *Pieris* or *Euchloë*. Seen under a moderate hand lens (dorsally), the appearance suggests an *Iulus*, due to the great distinctness of the subsegmentation, giving the impression of a large number of quite equal segments. There are, in fact, four subsegments to each abdominal segment, fairly equal, but the two front ones perhaps rather wider than the two posterior. Beneath the lateral line the flange is not continuous but is divided by an oblique projection on each segment. There are very numerous short black hairs, now hardly visible except in profile against a pale background. The larva is of very equal diameter from end to end, the head is only slightly smaller. The prothoracic plate presents, on each side, a very narrow black slip, with a good many black hairs, like those elsewhere. The larva has a habit of sitting in "sphinx" attitude.

In the 3rd instar the larva is substantially as in the 2nd, with an increase in length to 7·5mm. or 8mm. Head black with a pale transverse greenish shade. The colour is rather darker, and pale bases around the origins of the abundant black hairs can be distinguished.

In the following instars the hairs become less obvious, the colour becomes green, most of the full-grown larvæ being green with white lateral lines, a few, however, retain a brownish coloration.

The arrangement of hairs in 1st stage *Celtis* is, on prothorax, on each side of the middle line a group of four, the 1st (from middle line) and 3rd shorter and slightly posterior to 2nd and 4th. Then two, the second decidedly long, next another long one, all these approximately in a transvere line, then another a little posterior at about spiracular level. On mesothorax on each side, three short hairs about equally spaced in a transverse line, then a fourth rather longer and a little posterior, another longer one at a lower level and another further behind not quite so low. [On the metathorax the arrangement is the same.] On the abdominal segments are i, ii and iii, short hairs well apart, iii a little posterior to i, ii a good deal so. Two hairs, rather longer and more slender below spiracle, the posterior the longer and lower, on 9th and 10th, the arrangement is modified. On the posterior margin and beneath are more ordinary (pointed) hairs, some as long as those already noticed. These expand towards their extremities and have a circle of fine points, the appearance suggests that they are hollow and cupped like those of some Pierids. The longer are about ·05mm. in length the shortest about ·02mm. The prolegs have 9 to 11 hooks in two sizes and apparently in a single transverse row. (pl. xiii., figs. 1 and 2).

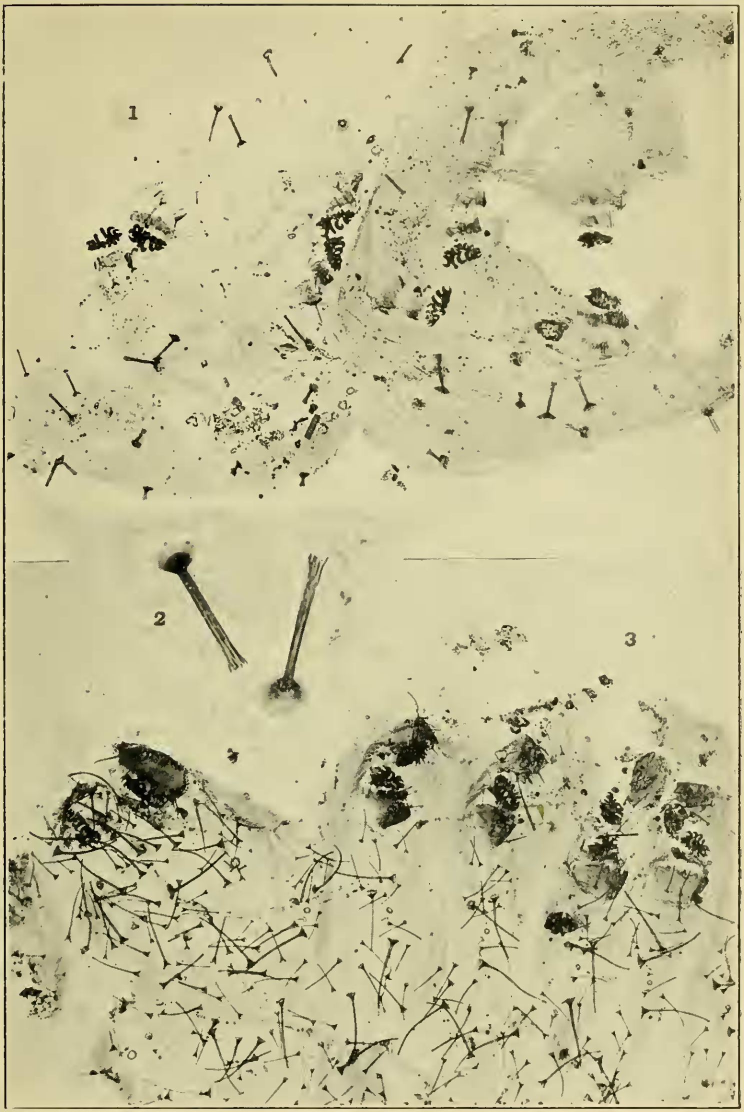

Photo. F. Clark.

Libythea celtis, Larval skins 1st and 2nd Instar.

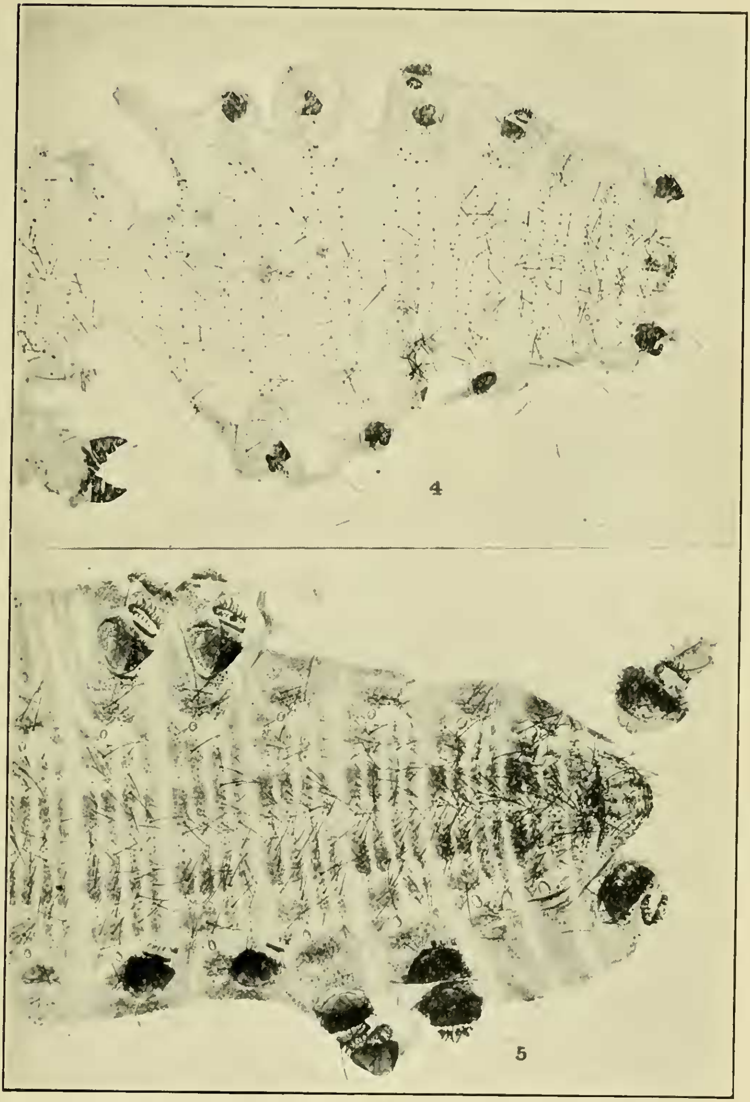

Photo. F. N. Clark.

Libythea celtis, Larval skins 3rd and 4th Instar.

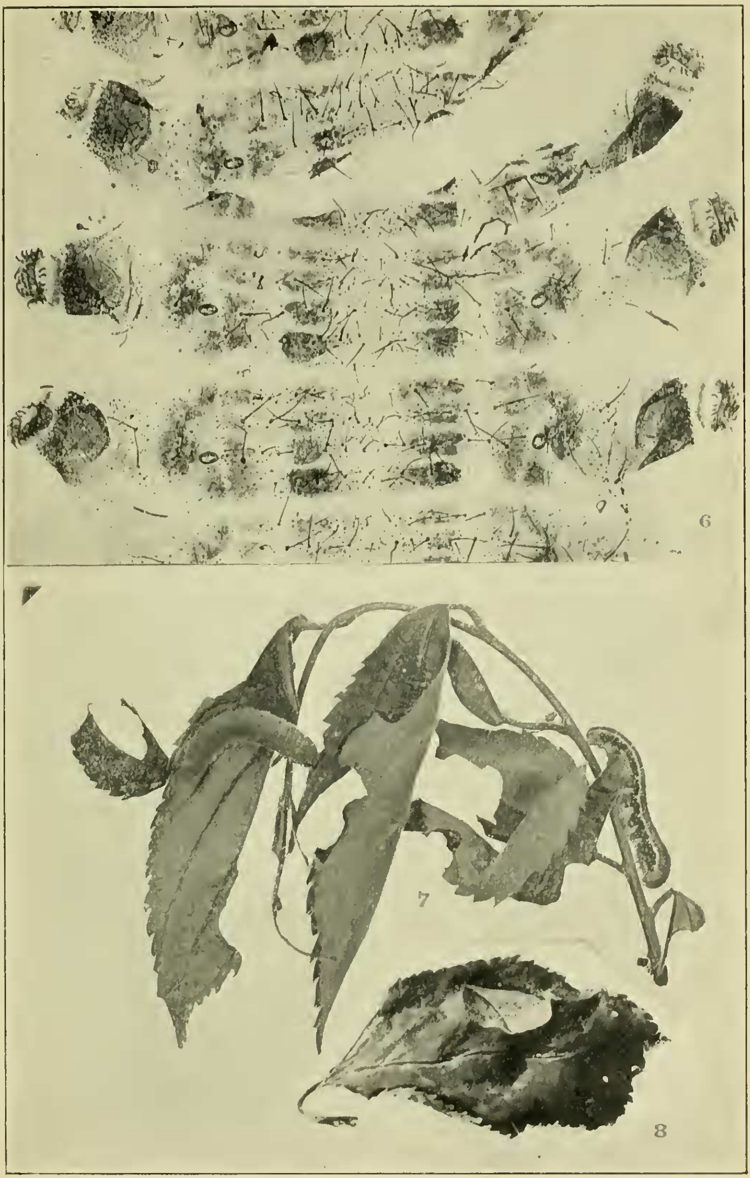

Photo. A. E. Tonge.

Libythea celtis, Larval skin last Instar, Larvæ and Pupa.

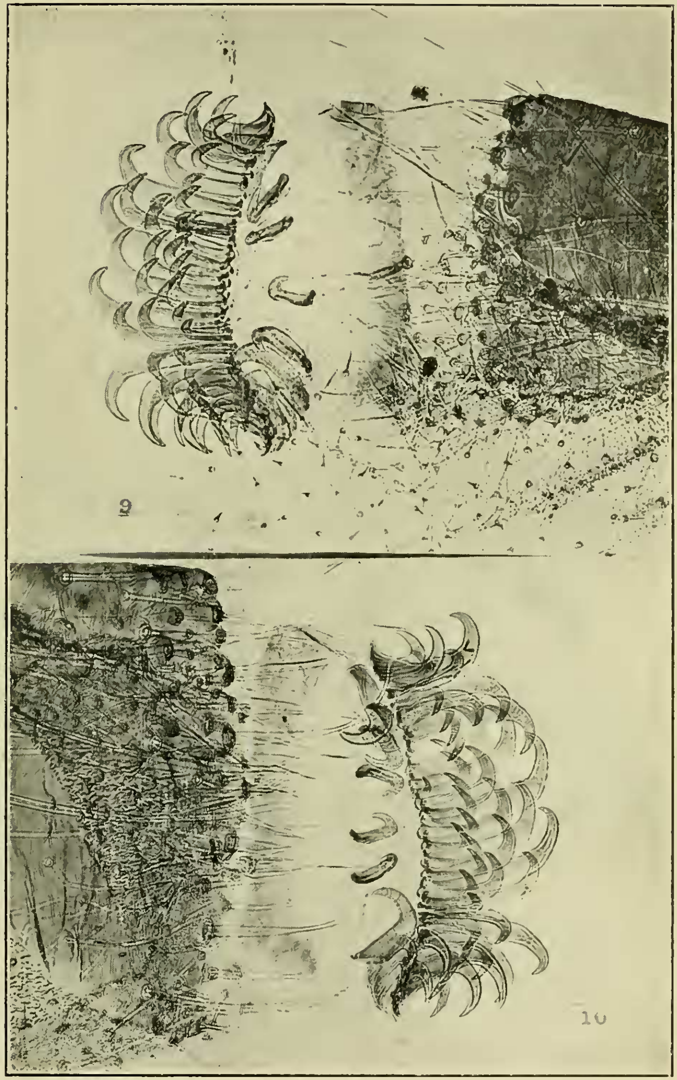

Photo F. N. Clark.

Libythea celtis, Prolegs of 5th abdominal segment, last larval Instar.

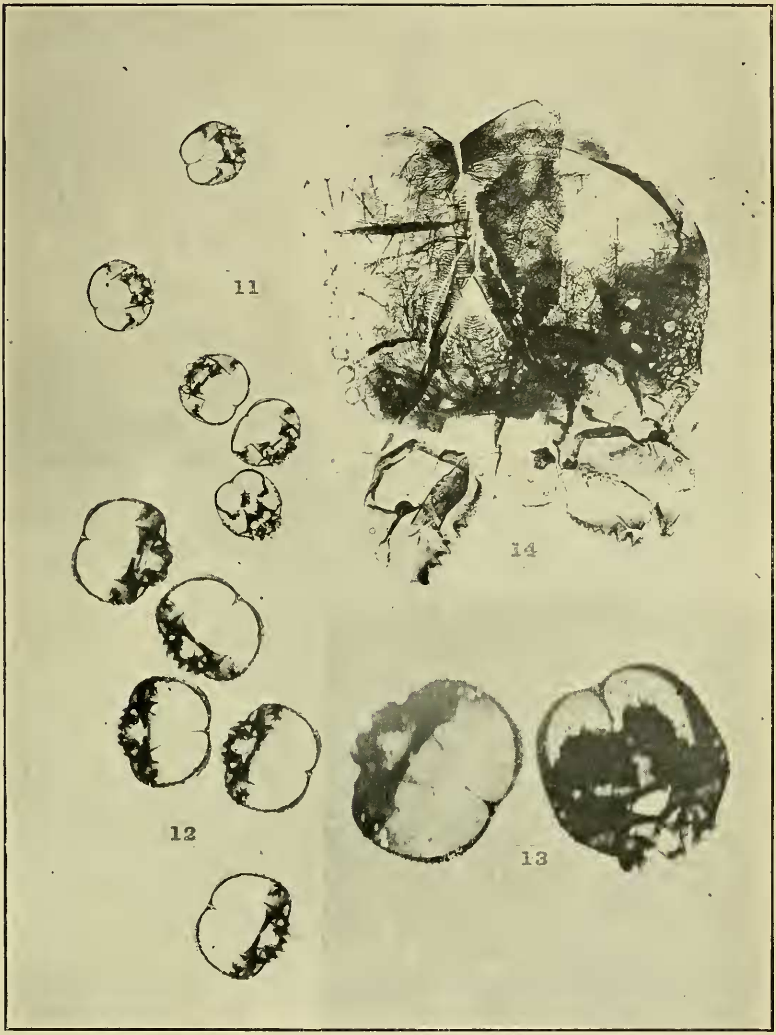

Photo. F N. Clark.

Libythea celtis. Larval heads, 1st, 2nd, 3rd, and 5th Instars.

In the 2nd instar the hairs are much more numerous, the primary that were present in the first skin are still to be distinguished as longer and larger (about 0·16mm. long)|; between dorsum and spiracle are, in addition to the three primary, 8 to 10 shorter hairs (about 0·08mm. long, except one just above spiracle very minute, about 0·015mm. long), all these have the same structure. The prolegs have 17 or 18 hooks, of which 4 or 5 are spread on the outer margin, the rest (in two sizes) packed along the inner (pl. xiii., fig. 3). My specimens of this instar are not clear enough to apportion the hairs to the several subsegments.

In the 3rd instar the hairs are more numerous, 15 or 16 secondary between dorsum and spiracle (pl. xiv, fig. 4). This photograph shows the 4 subsegments very distinctly and how the hairs are arranged in a central line across each subsegment. The division of each segment into four subsegments is distinct throughout all the larvl stages.

In the 3rd instar the prolegs have about 19 hooks alternately larger and smaller, they are of a full horse-shoe form, *i.e.*, a complete circle, but for a small gap at inner margin on the posterior sets, the first pair (on 3rd abdominal segment), however, show a complete circle with about 5 smaller hooks only along front margin. In the 4th instar the hooks are sparse and small on one margin, but a complete circle would be a correct description of most specimens.

In the 4th instar (pl. xiv., fig. 5), the hairs are very numerous and are so spread as to be irregularly placed across each subsegment, perhaps about 70 or 80 to the half segment above the spiracle, varying in length from 0·3mm. downwards, the prolegs have about 28 to 30 hooks without a very decided break in the circle except on the claspers, where the outer portion is bare for about a fourth of the circle. There are very numerous fine sharp skin-points, these are aggregated, with partial clear spaces. The places they occupy are dark on the photograph, looking almost like plates across the subsegments.

In the 5th (last) instar (pl. xv., fig. 6) the hairs are very numerous, especially the smaller that are tolerably evenly distributed, even between the subsegments. These minute hairs seem to be pointed, not coronate like the larger ones. The larger ones seem to be proportionally fewer than in the preceding instar, as though some of the smaller of that instar had joined the swarm of short ones in this. The longest hairs are about 0·4mm. long. The patches of sharp skin-points are less extensive than in the preceding skin, and show dark in the photograph. The prolegs in this instar have about 50 hooks closely packed in their alternating sizes on the inner side, but with only about seven on the outer margin, but these so spaced as to make it difficult to say there is an actual break in the circle, or where it is if there is one (pl. xvi., figs. 9 and 10).

Plate xvii. shows the larval heads from cast skins in all the instars except the 4th, of which I do not appear to have preserved a presentable specimen. That of the last instar is somewhat damaged. They are fairly regular in their increase in size from stage to stage, the ratio being apparently an addition of 50%, or as 2-3. The actual widths would be in millimetres—1st, ·4mm.; 2nd, ·6mm.; 3rd, ·9mm.; 4th, 1·35mm.; 5th, 2mm.

The full grown larva and pupa are beautifully shown in the photographs by Mr. Tonge (all the others are by Mr. F. N. Clark). The larvæ are on a spray of *Celtis australis*. I need say nothing about the pupa, as I described it in *Ent. Rec.*, vol. xii., p. 284 (pl. xv., figs. 7 and 8).

It is to be noted that the larva retains a cryptic coloration like the Satyrids, and has not developed a warning aspect like the Vanessids. The subsegmentation into four equal subsegments agrees with the simpler instances in Pierines and Satyrids, these usually have more subsegments, those that have four are probably more primitive in this respect, though they may not be so in others.

The hairs retain throughout the appearance at the extremity of having an opening, with some fine points round the margin (pl. xii., fig. 2, hairs of first instar × 500), but when the 4th instar is reached the extremity is not enlarged at all, with the trumpet-like extremity of the 1st and 2nd instars, but tapers fairly uniformly to the end, where, however, of course, it is not pointed, but as if truncated or broken off, until magnified enough to show the actual structure. As already noted the finer hairs in the last instar and those beneath are of the ordinary pointed form.

The structure of the larva is chiefly of interest so far as it may throw a little more light on the true affinities of *Libythea*.

There are several items that may be taken into account. The general appearance of the larva is certainly that of a *Pieris* or *Euchloë*, this one might pass over as a result of "convergence," in larvæ living exposed on green foliage, were it not that the hairs, if not precisely, are very nearly, identical with those of many Pierids, in having an extremity formed for exuding fluid. The gradual change in the number and arrangement of hairs as each instar arrives is much the same as in *Pieris*, but without ignoring this, its importance is small, as it is much the same in many different larvæ. The circles of hooks on the prolegs are so actually or nearly complete as to suggest that we have in them a record of affinities with much lower groups, no other butterfly that I know has complete circles of hooks, except among the *Hesperidae*.

The wing outline of the imago, and the foodplant of the larva, seems to point unmistakeably to alliance with *Vanessa*. The imaginal colouring gives the same suggestion. The pupa is Nymphalid, but certainly not Vanessid, perhaps more nearly Danaid. The egg is almost if not quite Vanessid. The palpi of the imago are, I believe, of no phylogenetic significance. Scudder (1889) is unable to suggest any utility they may have. I set a specimen or two to show their real meaning, in agreement with the attitude of living specimens. I called Mr. Tutt's attention to them, and I think they passed into his collection; where they are now I don't know, but Mr. Tutt published a note on the point in *Ent. Record*, vol. xi., p. 239. The cryptic habit so built up must have proved very useful, as it is still pronounced throughout the whole sub-family.

The neuration is rather Satyrid than Vanessid. The normal structure of the female fore-tarsi, would certainly place *Libythea* at the base of the Nymphalids. In this as in other cases we must remember that *Libythea* has had as long a time to be modified in various directions as its relatives, so that whilst such primitive characters as it possesses are probably significant, specialised characters, whether like those of its relatives or not, are more likely to be later acquirements and not to possess much importance in settling its phylogeny.

Explanation of Plates.

Plate XIII.—Fig. 1.—Portion of larval skin 1st instar × 120
,, ,, ,, 2.—Two hairs of ,, ,, ,, ,, × 500
,, ,, ,, 3.—Portion of ,, ,, 2nd ,, × 60
,, XIV.— ,, 4.— ,, ,, ,, ,, 3rd ,, × 15
,, ,, ,, 5.— ,, ,, ,, ,, 4th ,, × 15
,, XV.— ,, 6.— ,, ,, ,, ,, 5th ,, × 15
,, ,, ,, 7.—Two larvæ in the last instar on spray of *Celtis australis*.
,, ,, ,, 8.—Pupa of *L. celtis*.
,, XVI.— ,, 9.—Hooks of right proleg of 5th abdominal segment.
,, ,, ,, 10.— ,, ,, left ,, ,, ,, ,, ,, in last instar.
,, XVII.— ,, 11.—Larval heads of 1st instar × 25
,, ,, ,, 12.— ,, ,, ,, 2nd ,, × 25
,, ,, ,, 13.— ,, ,, ,, 3rd ,, × 25
,, ,, ,, 14.— ,, head of 5th ,, × 25

Courtship of Hepialus hecta.

By E. A. COCKAYNE, M.A., M.D. and F. W. J. JACKSON, M.A.

Being anxious to confirm the observations on the pairing habits of *Hepialus hecta* published in the *Entomologist's Record*, vol. xxiv., p. 236-7, we visited the spot again on May 31st this year. At 7.35 p.m. the first *H. hecta* appeared, flying rather slowly. As soon as it had settled we saw that it was a female, and looking round we noticed a male at rest on a neighbouring rush, with wings closed and scent-sacs exposed.

The female soon took flight again and approached the male, but swung off and settled two or three feet away and rested with quivering wings. After a few seconds she rose again and flew straight up to the male and actually touched him, but then dropped and settled almost on the ground. The male on being touched began to flap his wings and finally held both fore- and hind-wings spread open. Then he held the wings on the right side tightly closed while the left forewing was held out and constantly agitated. The female again flew up and soon approached the male, but failed to pair, and finally came to rest on a rush a few inches away. Meanwhile we had noticed another male flying pendulum-wise some yards away. After a short time he had approached the first male, and then flown off to a rush two or three feet away where he had alighted and remained with the forewings held almost at right angles to the body, and the hindwings closely applied to it in the attitude commonly adopted while waiting for a female to approach. Immediately after the last attempt of the female to pair with the first male, the second took flight again and went straight to the female, settled just below her on the same rush, ran up and paired. After pairing he let go at once and hung suspended with legs and wings folded up.

We have given a full account of the incident, because cases of this kind are unusual. Sexual instinct is very fixed: in most species the male invariably seeks the female, in a few the female the male. Occasionally however females are caught by assembling as happened to one of us at Rannoch some years ago, where a female *Trochilium* *scoliaeforme* was caught amongst a number of males attracted to a virgin female, though unfortunately its sex was not noticed until after it had been killed. It seems doubtful if such cases are exactly parallel to the one we report, as there is no evidence published to show if the attracted female is a virgin.

SCIENTIFIC NOTES AND OBSERVATIONS.

Resting habit of Pyrameis cardui, Colias edusa, and Pieris napi.—On July 26th, 1912, in the late afternoon I watched separately, two ♀ *C. edusa* dawdling along on the Downs near Beachy Head, evidently in search of something. Eventually, they came to a straggling bramble, and after examining one or two leaves, finally took up a position for the night under one of them, resting head downward.

On July 28th, 1912, at Abbott's Wood, I saw a specimen of *P. napi* flying in a short interval of sunshine. Suddenly the sun became obscured and a few spots of rain fell. Instantly the *P. napi* flew to a bramble bush and took up a position of shelter, head downward under a bramble leaf.

On August 16th, 1912, in the late afternoon while sitting on the shore under Beachy Head my attention was drawn to a specimen of *P. cardui* flying about the face of the cliff searching for something. I watched it for ten minutes entering a number of crannies, until at last it found one which suited its purpose and there settled for the night. I put these on record for what they are worth, and may have occasion to refer to them later.—C. W. Colthrup, 141, East Dulwich Grove, S.E.

Irregularity of hatching of ova of Ennomos erosaria.—In "Practical Hints for the Field Lepidopterist," Part 3, page 15, the late J. W. Tutt refers to the irregularity of hatching of the ova of various species, and remarks on the few reliable recorded observations on the point. It may be as well therefore to record that from a batch of ova laid by a ♀ *E. erosaria*, which I took in the New Forest in November, 1911, the first hatched on April 8th, 1912, and the others continued to do so up to June 22nd. The first larva pupated on June 9th, and the first imago emerged on June 22nd, the same day that the last ova hatched.—Id.

Fertility of Liparis dispar.—At the beginning of June 1912, on leaving home for a time, I left a number of pupæ of *Liparis dispar* in a large cage. On overhauling them on August 1st after my return, I found that twelve ♂ s and 44 ♀ s had emerged and that at least 43 batches of eggs had been laid.

The remains of ♀ moths shewed 42 that had certainly laid all their eggs, the bodies being shrivelled and the apical wool expended, several that were perhaps less shrivelled than the rest were found, however, to contain no eggs. In two cases the apical wool was more or less present, and the bodies of these two specimens contained eggs.

On June 3rd, 1913, practically all the young larvæ had hatched and it was found that of the 43 batches of eggs 42 had been completely fertile, whilst one small batch contained a good many apparently unfertilised eggs.

I put this observation on record as such data are sometimes asked for. Of various points it may help to elucidate, it bears on the pro-portions of the sexes in insects, in *L. dispar*, at least, it is obvious that an excess of ♂s is by no means a necessity and probably, therefore, does not occur. The actual proportion of the sexes in the experiment was, of course, purely accidental, but it shewed that one male to three or four females was a good working ratio.—T. A. CHAPMAN, M.D., Betula, Reigate. *June 9th*, 1913.

COLLECTIVE PROTECTIVE RESEMBLANCE. — In the *Bulletin de la Société Entomologique de France* for 1913, page 137, is an article by the abbé J. de Joannis, on a collective case of protective resemblance. The writer had been compiling a list of Lepidoptera-Heterocera which are exclusively injurious to cultivated Monocotyledons, such as sugar-cane, rice, maize, sago, etc., in India or Java. After doing so he was struck by the fact, that out of the 29 species in his list, no less than 17 belonging to five different families, had essentially the same design of markings on the wings, and were thus particularly adapted to the special circumstances in which their lives had to be spent. The general character of these markings were longitudinal from base to outer margin of the cell, at the outer extremity of which it rayed out fan-like. The transverse markings were some discontinuous lines of a few dots, and the ground pale yellow, dull orange, brown or whitish-yellow. All the species had the lower wings very much differentiated in marking from the upper ones. These insects, sitting on the stems of the plants they frequented, with rayed markings such as these would no doubt be admirably protected by their surroundings. At once he noticed that the remaining 12 species fell into two groups, one of six species, small, white, yellow or sombre in colour, uniform, without markings except an inconspicuous discal dot, the other group of six species more or less conspicuous, and no doubt protected in some more special way in accord with their own peculiar habits.

The species in M. de Joannis' list are:—

NOCTUIDÆ. — *Cirphis loreyi**, *C. fragilis**, *C. unipuncta**, *Sesamia inferens**, *S. uniformis**.

LYMANTRIIDÆ.—*Laelia suffusa**, *L. adara**, *Aroa socrus**, *Dasychira securis**.

SPHINGIDÆ.—*Leucophlebia lineata**.

EUTEROTIDÆ.—*Dreata petola*.

NOTODONTIDÆ.—*Anticyra combusta**.

PSYCHIDÆ.—*Mahasena graminivora*†.

PYRALIDÆ.—*Polyocha saccharella**, *Anerastia ablutella*†, *Schoenobius bipunctiferus*†, *Scirpophaga excerptalis*†, *S. auriflua*†, *S. monostigma*†, *Diatraea venosata**, *Chilo simplex**, *C. auricilia**, *C. infuscatellus**, *Ancylolomia chrysographella**, *Nymphula fluctuosalis*, *N. depunctalis*, *Cnaphalocrocis medinalis*, *Marasmia trapezalis*, *Pyrausta coclesalis*.

Those marked * are the 17 species with similar markings; those marked † are the 6 species with unicolorous forewings; the unmarked species are the 6 more or less conspicuous ones.—H.J.T.

DIVERGENCE IN THE FORWARDNESS OF THE SEASON IN DIFFERENT PARTS OF SWITZERLAND.—During a month in Switzerland, in 1912, which was by no means prolific in specimens, the fact that one cannot judge of the forwardness or otherwise of the season in one part of Switzerland from another was more forcibly borne in on my attention than has ever been the case in my long experience of that country.

At Simplon Village and in the Laquinthal the season was unusually early. *Erebia christi*, for instance, was well out in the last week in June (which may possibly account for the pessimism displayed by certain Swiss Entomologists as related in our last number), and I thought that by arriving on the Albula Pass a week earlier than I did in 1911 I should certainly not be too early for species such as *Erebia pharte*, *Melitaea maturna* var. *wolfensbergeri*, etc., which had been quite in rags the year before, nor even for those which, like *M. asteria* and *Hesperia andromedae*, had been well out on the previous occasion. My disappointment was therefore great when *M. maturna* only put in an appearance, in the shape of two very fresh specimens, on the last day of my week's stay, *E. pharte* in one specimen on the same occasion, and *M. asteria* and *H. andromedae* never appeared at all, other species also being equally late, with the general result that, as far as specimens here were concerned, I might almost as well have stayed at home.—George Wheeler, 37, Gloucester Place, W. *July* 1*st*, 1913.

Gonepteryx rhamni and G. cleopatra in company.—An equally unsuccessful visit was one I paid to the Ligurian Riviera this spring; there was however one fact which seems worth recording, *viz.*, that *Gonepteryx rhamni* and *G. cleopatra* were just about equally common in the Portofino peninsula. The former were generally as large as, sometimes larger than, the latter. The ♂ s of course are easy enough to distinguish and the ♀ s may equally well be recognized by the pale orange streak near the middle of the forewing on the underside of *G. cleopatra*. There was no sign of intermediates, and if there is still anyone who supposes that *G. cleopatra* is the southern form of *G. rhamni* this experience should go far to remove the impression.—[Id.]

Apperceptional Expectancy.—In a short article in the *Can. Ent.* for June, Harry B. Weiss contributes some interesting remarks concerning Protective Resemblance. He says that, "The perception of an insect is modified by associated perceptions from adjoining surroundings or adjoining parts of the butterfly. In addition to sensation, which is the result of stimulation upon the organ of sight by the object in question, perception is also determined by apperception which is the contribution of the mind from previous experience. In other words the mind also contributes something which helps to form the complete mental content. . . . . Without this apperceptional expectancy fact insects would be more conspicuous than they are. . . . . Many trained observers, and in fact, numerous birds, are able to overcome this expectancy, and as a result discriminate such insects from their surroundings, although such discrimination may be due in part to an ability to perceive them. By reason of this apperceptional expectancy many insects also appear more conspicuous amid certain surroundings than others. The more the coloration of an insect approaches that of its surroundings, the less conspicuous it becomes, but in all cases apperceptional expectancy tends to make this inconspicuousness more complete, and, as a rule, more protective."—[Quite so!]

NOTES ON COLLECTING, Etc.

Deiopeia pulchella.—On Saturday last, June 14th, whilst collecting on the Surrey Downs with my brother, Mr. A. Russell, I had the good fortune to capture a specimen of this rare moth in fine condition. I am not collecting moths this season, but being struck by the size and peculiar flight of the insect, which seemed unusual for any white moth of my acquaintance, I gave chase and when it settled secured it to give to my brother. A cursory glance in the chip box (in which I had placed it when settled) showed the moth to be of the "footman" family, but although the insect seemed familiar to me I did not at once recognise it, and a few minutes after handed it to my brother remarking that I had got a prize for him. He at once identified the moth and desired me to retain it.—S. G. Castle Russell, 14, Waldegrave Park, Twickenham.

Lophopteryx carmelita in Northumberland.—On May 12th I was fortunate in finding a ♂ and a ♀ of the above species on the trunk of a birch tree, the moths were about four inches apart. The ♂ was rather worn but the ♀ in good condition. I boxed the latter and by the 15th she had deposited 13 eggs. I then killed it as I was anxious to have the specimen set up, this being a record for this country. The eggs were fertile and the larvæ emerged on the 27th and 28th May. The specimens were taken near the Tyne Valley, South of Carbridge, which place is about 17 miles West of Newcastle.—G. Nicholson, 26, Lancaster Street, Newcastle.

Gloucestershire Lepidoptera.—Since my notes in a previous volume, the following species, apparently unrecorded for the county, have been captured by myself. *Tischeria angusticollela*, June 5th, 1912, flying in the evening among *Rosa canina* in this neighbourhood; *Chrysoclysta schrankella*, June 15th, 1911, at dusk over marshy ground; and *Gelechia scalella*, June 2nd, 1913, resting on a lichen-covered oak, the last two occurring in the Dean Forest district.—W. B. Davis, 3, Rosebank Villas, Churchfield Road, Stroud, Glos. *June 7th*, 1913.

Colias edusa.—Are we in for an *edusa*-year? I saw one on June 2nd at Godstone, Surrey, my friend, Mr. M. Robinson, took one at Reigate on June 3rd, and on June 9th I took a ♂ at Chailey, Sussex. —A. E. Tonge (F.E.S.), Aincroft, Reigate. *June 9th*.

At Ascot, on June 2nd, I took a freshly emerged *Colias edusa*, a large and pale specimen, and on June 3rd I saw three more at Horsley. I have also seen several worn *Pyrameis atalanta* and *P. cardui*.—A. W. Buckstone, 18, Burlington Lane, Chiswick. *June 10th*.

On June 4th I saw a specimen of *Colias edusa* flying near a clover field at Aldermaston.—J. Clarke, 7, Castle Crescent, Reading. *June 10th*.

I have seen several *Colias edusa*, and it looks as if the continental things are coming over this season.—S. G. Castle-Russell, 14, Waldegrave Park, Strawberry Hill, Middlesex. *June 15th*.

Colias edusa in 1912.—It may be of interest to put on record my experiences with the above species in 1912. My friend, Mr. E. P. Sharp, took two ♂ s and two ♀ s fresh out, at Abbott's Wood, on July 21st, and I subsequently found that other collectors had taken a number of ♂ s near Eastbourne in the previous week. On July 24th I saw two ♂ s on Eastbourne front in the morning, and two more on my way to Beachy Head. On my arrival there I took one ♂ and one ♀ var. *helice*, both fresh out, and saw another var. *helice* flying madly with the wind and quite impossible of capture. On the 25th a journey with Mr. Sharp to a field of clover and other flowers, a good way out over the Downs, was disappointing. The early morning was fine, but on arriving on the field at 10.20 a.m., the sun became obscured, and did not appear again till 4.30 p.m., too late for *C. edusa* to fly. I, however, had the good fortune to take a freshly emerged ♂ and ♀ in a warm bright interval, both of which I disturbed as I chased a specimen of *Argynnis aglaia*. They were, however, very lethargic and quite easily captured. I saw another ♂ flying, but lost sight of it in the sunburnt grass. There is no doubt that, had the day kept fine, we should have made a good bag, and to make matters worse a man started mowing the field with a machine, and when we returned two days after the flowers were all laid low. On the 26th I paid a visit to Beachy Head, and the sun again became obscured this time only by a thin veil of mist. Two ♂ s were seen flying out of reach, and another freshly emerged was taken quite easily on a clover flower. Soon after I missed another which was careering madly along, and in giving chase disturbed yet another which disappeared over the cliff. At 4.30 p.m. I took two fresh ♀ s at rest on the undersides of bramble leaves (see p. 196). On the 27th I took one ♂ and three ♀ s freshly emerged, and Mr. Sharp netted a worn ♂, the sun being again behind a haze. On the 28th we cycled to Abbott's wood, but the wind developed into a gale, the sun became obscured and *C. edusa* was out of the question, although Mr. Sharp's son took a ♂ and ♀ in a sheltered spot near Eastbourne in a bright interval.

On August 2nd, on the way up to Beachy Head, quite a number of *C. edusa* were seen flying with the strong wind toward the town, stopping on the way to visit the red valerian on the slopes. Arrived at Beachy Head I took six specimens and met three other collectors who had taken eleven between them. On August 5th, Mr. Sharp and I cycled to the Downs, the day being fine, but a very heavy wind blowing. We missed two ♀ *C. edusa*, and in chasing one I had the misfortune to fall and badly injure a finger which put an end to cycling. I however visited Beachy Head on the 11th, when the sun was again obscured by mist and a heavy gale blowing, but in a sheltered spot I found a ♂ *C. edusa* enjoying the red valerian and managed to net it with my left and uninjured hand. On August 13th I saw a number of *C. edusa* on the railway banks near Brighton and on the 14th on the banks near Polegate, and met a collector who had counted thirteen on the railway banks between Polegate and Hailsham when passing in a train. I give these rather extended notes to show that had the weather been favourable *C. edusa* would, no doubt, have been very plentiful. At Margate, between August 24th and September 14th, I netted five ♂ *C. edusa*, all very badly worn. During the whole of my stay at Eastbourne and Margate I saw no signs of *C. hyale*. In going through my notes and series of *C. edusa*, I find that I have had the good fortune to take it in 1900, 1902, 1904, 1906, 1908, 1911, and 1912, and as Mr. South records it in *British Butterflies*, page 53, in 1892, 1893, 1894, 1895, and 1899, it would appear to be a pretty frequent visitor. The weather in 1903, 1907, 1909, and 1910 was very unfavourable and no doubt accounts for its absence. *C. hyale* I have only taken in 1900, 1901, and 1911, and Mr. South records it in 1892, 1893, 1899, 1902, and 1904.

In 1911 the weather was gloriously fine, yet although *C. hyale* was common I only saw two *C. edusa*. If failure of foodplant was the cause of these migrations, as I have seen suggested, one would expect both species to be affected in the same year.—C. W. Colthrup, 141, E. Dulwich Grove, London, S.E.

A Plea for the Preservation of Euchloë Cardamines.—On one of the rare outings which we have been able to permit ourselves this Spring, to wit, on May 24th, we passed a most enjoyable afternoon at Horsley.

Leaving the station, we tramped a mile or so along the main road until we turned off down a lovely little lane, so narrow and so rough as not to allow the passage of the motors, which went rushing off one after the other to the left along the wider road.

As the sun was extremely powerful, and it happened that we had brought with us neither net nor camera, we rested long on the grassy banks, spangled with the starry stork's-bill, bright blue speedwell and myosotis, with masses of fool's parsley and hedge garlic, beloved of *Euchloë cardamines*; the fresh green of the banks and hedges, the beautiful play of sunshine on the road, together with the shadows thrown by the tall elms, the songs of numberless birds, and the genial warmth, the peace and restfulness of the whole scene were altogether delightful.

One thing, however, was lacking! Where were the multitudes of butterflies of various species, which, in Spain, Switzerland or France, would have given an entrancing air of life and movement to the scene? Certainly, a solitary and lonely-looking *Euchloë cardamines* appeared here and there, flitting from flower to flower of the stork's bill, testing the delights of each, or settling on the hedge garlic, displaying its charming orange tips, which seem to speak to one of Spring sunshine.

Farther down the lane, when at last we continued our walk, were one or two others, flying over and above the hedges, the orange tints being quite distinctive even at a distance.

We were congratulating ourselves that there were a few, if only a few, of these spring butterflies left to brighten the lanes of Surrey, and turned away to the right to ascend through a wood, when down the slope towards us, came an entomologist, armed with big black net, no doubt bent on slaughtering our poor *cardamines*!

We did so wish that something could be done to protect these and others of our beautiful lepidoptera, in places where they are evidently becoming fairly worked out.

If only all collectors of British *Diurni* would sometimes leave their nets at home on nice sunny days, and take their pleasure in observing the habits of insects instead of diminishing their already extremely small numbers!

. . . .

I understand that, on the following Saturday, a party of between twenty and thirty lynx-eyed entomologists scoured the same district, the average "bag" being extremely small. Is it to be wondered at?—Rosa E. Page, (B.A.), New Cross, S.E. [Report hath it that very little "scouring" was done.—H.J.T.]

CURRENT NOTES AND SHORT NOTICES.

In the *Revue Mensuelle*, for April, M. Lambillion announces an aberration of *Pyrameis cardui* as new. He describes it as follows:—

"Multo obscurior, alarum maculis nigris majoribus, alis posticis nigro conspersis, ab. *melanosa*." The forewings are a very deep black with almost all the black spots confluent, and the paler areas much restricted. The hindwings clouded with black, the three sub-marginal spots confluent and much enlarged, the paler areas much reduced and darkened with dusky scaling. Several specimens were obtained at Virton, by M. l'abbé Cabeau in August, 1912.

In a subsequent paragraph in the same Magazine M. Lambillion remarks on the figure of the aberration of *Dryas paphia* published in the *Ent. Record* recently, that the author (Mr. Sich) has omitted to name it and probably has the erroneous idea that unique aberrations occur in nature. M. Lambillion is strongly of opinion that for the purpose of reference this form should have a name.

We are pleased to receive two further parts of the *Catalogue of the Lepidoptera of Belgium* by M. L.-J. Lambillion, of Namur. It contains a further amount of *addenda* accumulated since the appearance of the earlier parts which have been published as a Supplement to the *Revue Mensuelle de la Société Entomologique Namuroise.* The parts can be obtained separately for a small charge.

In the *Scottish Naturalist* for April, Mr. W. Evans records the following moths captured at the lantern of the lighthouse on Fair Isle in 1912. *Triphaena pronuba*, one dark purple-brown form, and two pale yellowish-grey variety; *Hadena dentina*, one; *Plusia gamma*, five. These have already been recorded from Shetland but not previously from Fair Island.

In the April number of the *Ent. Mo. Mag.*, Lieut.-Col. E. G. Nurse announces two species of Hymenoptera as new to Britain. *Crabro kiesenwetteri* was taken at Ampton and West Stow, Suffolk, in 1912, and is nearest to *C. tibialis* and *C. clavipes*. *Polistes gallicus* occurred at Chandler's Ford, Hants, and were taken by Major Robertson in 1911.

Mr. J. H. Wood announces four hitherto unrecorded species of *Anthomyidae* (Diptera) in the April number of the *Ent. Mo. Mag.* Two of them, *Pegomyia dulcamarae* and *Coenosia stigmatica*, he describes as new to science. The former was taken by the edge of Devereux Pool, and the latter near Monnow. *Phaonia* (*Hyetodesia*) *magnicornis* was first taken at the above named places, and *Coenosia perpusilla* is not uncommon on the Black Mountain range in July.

In the *Entomologist* for March, Fred. V. Theobald announces the occurrence of a hitherto unrecorded species of saw-fly from Hampshire and Berkshire. The larvæ were sent to him in 1911, and imagines were bred in April and May, 1912. It has been identified by the Rev. F. D. Morice as *Lygaeonematus moestus*. The larvæ have been very destructive to apple foliage at Froxfield, Hants.

In the May number of the *Ent. Mo. Mag.*, Dr. Lindinger announces *Aspidiotus bavaricus* a Coccid new to the British List. It was found on *Calluna vulgaris* at Chester and Aberdeen.

Mr. J. E. Collin has commenced a further List of thirty Diptera new to the British List in the May number of the *Ent. Mo. Mag.* Empidæ.—*Cyrtoma intermedia*, from the New Forest to Aviemore. *C. pilosa*, from Sussex to Sutherland. *C. simplicipes*, from Dorset to Aviemore. *Rhamphomyia obscura*, taken by J. J. F. X. King at Kilmun in 1906. *R. hirtula*, from Clova, Forfar. *R. tibialis* taken at Aviemore by Col. Yerbury in 1904. *R. nigripennis*, from Brockenhurst to Spey

Bridge. *R. hybrida*, from Nethy Bridge, Padstow, Oxford, etc. *Empis rufiventris*, from Wormsley Park and Timworth. *Hilara quadrifaria*, from Wicken, etc. *H. fulvibarba*, from Studland, Lyndhurst, etc. *Synamphotera pallida*, taken by Mr. D. Sharp in the New Forest. *Tachydromia macula*, from Tarrington, Wormsley, and Spey Bridge. *T. thoracica*, from Lyndhurst, Porthcawl, etc. DOLICHOPODIDÆ.—*Syntormon mikii*, on boggy ground near Trevone, Cornwall. *Acropsilus niger*, taken by C. G. Lamb, near Padstow. SYRPHIDÆ.—*Chilosia globulipes*, taken by Lieut.-Col. Nurse at West Stow in 1911. ANTHOMYIDÆ.—*Calliophrys exuta*, from Windermere, Dawlish, Barmouth, etc. *Lispe consanguinea*, taken by Mr. Lamb at Padstow. *Dexiopsis lacteipennis*, taken among marram grass at Walton-on-Naze by Col. Yerbury. *D. rubricornis*, found by Col. Yerbury at Porthcawl in 1903 and 1906. *Pegomyia ulmaria*, in the garden at Newmarket. *P. nigrisquama*, taken by Mr. Harwood at Colchester. BORBORIDÆ.—*Limosina caenosa*, from closets at Oldham in November, 1911, etc. *L. pullula*, from Chippenham Fen. SAPROMYZIDÆ.—*Sapromyza laeta*, taken by Col. Yerbury at Nethy Bridge and Loch Assynt. *S. quadrinotata*, taken at Lochinver by Col. Yerbury. *S. apicalis*, from Frinton-on-Sea, Essex. CHLOROPIDÆ.—*Diplotoxa ruficeps*, taken by Col. Yerbury at Loch Assynt. GEOMYZIDÆ.—*Aphaniosoma quadrinotatum*, taken by Mr. Lamb near Padstow. *A. approximatum*, from Walton-on-the-Naze.

In the April number of the *Entomologische Mitteilungen* Geo. C. Kruger gives an account of several species of Lepidoptera from Sardinia, *Lymantria krugeri*, *Agrotis jordani* and *Herminia gigantea*; and notes on other species found on the Italian mainland, the forms of *Euchloris prasinaria*, *Arctia villica*, *A. konewkai*, and *A. angelica*.

In the current number of the *Canadian Entomologist*, F. H. Wolley Dod continues the valuable series of notes which he has long contributed on Alberta Lepidoptera; and E. P. Venables gives an instance of several specimens of *Grapta j-album* being attracted day after day to a piece of bacon hanging from a branch of a tree, constantly alighting on and around it.

In recent numbers of the *Ent. Mo. Mag.*, Mr. D. Sharp, F.R.S., described the following species of Coleoptera:—(1) *Haliplus brownei*, new to science, is extremely like *H. fluviatilis* with which it has hitherto been confused. It occurred in 1868 at Stony Stratford in the River Ouse. This name *brownei* Mr. Sharp subsequently "corrected" to *browneanus*. (2) *Actobius ytennensis*, new to science, was taken in May, 1909, near Beaulieu Road Station, among moss; it is allied to *A. signaticornis* and *A. cinerascens*. (3) *Tachys* (*Tachyura*) *walkerianus*, new to science, is allied to *T. parvulus* and was taken in the New Forest in company with the last species. Mr. Norman H. Joy describes the following species:—(1) *Quedius subapicalis*, new to science, was found at Brockenhurst in August, 1912, and is allied to *Q. cruentus*. It occurred in an old owl's nest. (2) *Atheta magniceps*, new to Britain, was taken in Inverness-shire in October, 1909, in flood rubbish. It is very similar to *A. debilis*. (3) *Atheta terminalis*, new to Britain, discovered in Mr. Champion's collection. It is related to *A. elongatula* and was taken at Gosport. (4) *Philonthus scoticus*, new to science, was found in Inverness-shire by Messrs. Joy and J. R. le B. Tomlin, and is quite distinct from others of the genus. Mr. E. A. Newberry describes *Trachyphloeus digitalis*, new to Britain, from specimens obtained on the banks of the Medway at roots of *Helianthemum* and *Lotus*. It is very close to *T. spinimanus*.

The bed of the old lake Florissant, Colorado, still continues to yield fossil remains of the Insecta. We have just received the *Bulletin of the University of the State of Iowa* containing a long account of the study of a collection made in the summer of 1912 by H. F. Wickham. A list of 95 species of Coleoptera is given, all of which were obtained in a small excavation in the shale, not more than six feet deep and possibly some twenty feet long. It is curious that the group, which was the best represented, was the *Rhynchophora*, by some thirty-eight species. Six plates are appended to the paper.

Herr W. Junk (Berlin) sends out a special edition of his Catalogue of Works on Lepidoptera, No. 46, with the title *Bibliographia Lepidopterologia*, in virtue of a preface of twenty pages "Des Lepidopterologische Literatur," and six giving a list of *Auctores Lepidopterologici* ("living" understood). The title is a little ambitious, but for a short paper, the "Lepidopterological Literature" may be useful, as the author proposes, in suggesting "the value (for the collector and the scientific worker) of the chief Lepidopterological books and periodicals." It might be easy to criticise it, but as an appreciation of standard works and periodicals, by one who has opportunities of judging of the extent to which they circulate, it has a definite value. The list of living authors must similarly have a certain value, but it would be easy to make a considerable list of names, some of which at least ought to have been included.—T.A.C.

That huge summary and general review of the results of the close and continuous study of Systematic Entomology for the 150 years which has elapsed since the time of Linnæus, *viz.*, the *Genera Insectorum*, has reached fascicule 150. M. Wytsman of Brussels, who, with a committee of well known entomologists, is responsible for the issue of this undertaking, has obtained the help of the best specialists in each Family. A separate fascicule, with its own plates and pagination is devoted to each Family or Sub-family, and is in the mother tongue of the author. Some plates are plain, some are coloured, as the subject requires. The greatest progress has been made with Coleoptera, of which 51 fascicules have appeared, of the Hymenoptera 27 and of the Lepidoptera 24 fascicules. Among the authors from the British Isles are Dr. Jordan, H. Eltringham, Hon. Walter Rothschild, L. B. Prout, Dr. Burr, E. Meyrick, W. L. Distant, T. Theobald, Rev. W. W. Fowler, the late R. Shelford, the late M. Jacoby, etc.

In a recent number of the *Feuille des Jeunes Naturalistes* is an interesting article on the "Frequency of Melanism in the Lepidoptera of the North-West of France." There is a list of the species in both Macro- and Micro-Lepidoptera in which this phenomenon has been observed in that district. The records were taken from six collections only, but they are said to be large and comprehensive ones. In the Rhopalocera are *Papilio machaon* ab. *nigrofasciatus*, *Pieris napi* ab. *bryoniae* (!), *Polyommatus phlaeas* ab. almost black forewings, *Apatura ilia* ab. *iliades*, *Limenitis populi* ab. *tremulae* and ab. *nigra*, *L. sibylla* ab. *nigrina*, *Vanessa levana* ab. *obscura*, *Grapta c-album* ab. very brown, *Melitaea aurinia* ab. *obscura*, *M. athalia* ab. *navarina*, *Brenthis selene* ab. black, *Dryas paphia* ab. *valesina*, and *Epinephele jurtina* ab. black.

The cause of this form of aberration is put down to the very damp winters which have been experienced of late years.

In Part I. of the *Trans. Ent. Soc. Lond.*, 1913, just issued, Mr. W. J. Kaye contributes a summary of his "Observations on Mimicry" in the South American section of the family *Syntomidae*, the models for which are chiefly Hymenoptera. There is a coloured plate of some of the more striking mimics and models, so that those who are not so fortunately situated as members of our London Societies, may form an idea of these extraordinary resemblances and of the marvellous contrivances by which the similarity is produced in different instances. Dr. G. B. Longstaff contributes another of his intensely interesting and informative papers, on the "Butterflies of the White Nile; a Study in Geographical Distribution," illustrated by a map of his wanderings, and a plate of figures of three very rare Pierids, *Pinacopteryx venata*, *Teracolus ephyia*, and *T. liagore*. Of the 75 species of Rhopalocera taken in the area, no less than 33 belong to the *Pierinae*. Mr. G. T. Bethune-Baker contributes a short paper on the "Specific Distinction of *Chilades galba* and *C. phiala*," two Lycænids of Western Asia, illustrated by a plate of the genital armatures. He also contributes a second paper on similar lines dealing with the "Specific Distinction of several species in the *orbitulus* and *pheretiades* section of the genus *Plebeius*," illustrated by three plates containing figures of the genital armatures. There are also two faunistic papers, by Messrs. C. G. Champion and E. Meyrick. Last, but quite as interesting as any of the papers, are thirty-two pages of the Proceedings in the Ordinary Meetings. These pages are replete with important observations, short contributed notes, summaries of discussions, letters from corresponding members, remarks on exhibits, records of experimental work from all parts of the world, opinions of specialists on various questions, etc., collected and edited with infinite care and labour by the Hon. Secretary, the Rev. Geo. Wheeler. Such carefully edited miscellaneous matter forms a mine of wealth for future work if properly and fully indexed.

The decease was recently announced of Philip de la Garde, R.N., F.E.S., of 8, Queen's Terrace, Exeter. He had been a Fellow of the Entomological Society of London since 1892, and was a student of the Lepidoptera and Coleoptera, occasionally contributing notes on those group to the *Ent. Mo. Mag.* In the "nineties" he contributed several articles and notes to the pages of the *Entomologist*, containing lists of the Lepidoptera taken and observations made in various parts of the world during the voyages necessitated by his professional duties.

We have received a copy of a paper by Dr. Roger Verity of Florence, read at the Linnean Society in May, entitled *Revision of the Linnean Types of Palaearctic Rhopalocera*, which we can fairly say outpriorityises priority, and undoubtedly the extraordinary changes in the nomenclature of our butterflies there put forward should receive the earnest and thorough consideration of the new National Nomenclature Committee before coming into general use. In fact, we take it that henceforth all names proposed and all alterations suggested may be brought before this committee by any objector.

M. Verity has closely examined the existing collection of Linneus in the possession of the Linnean Society, now at Burlington House and has considered every specimen, label, pin, etc., with the four later descriptive works of that author, *viz.*, *Systema Naturae*, ed. x., 1758, *Fauna Suecica*, ed. ii., 1761, *Museum Ludovicae Ulricae*, 1764, and *Systema Naturae*, ed. xii., 1767. Linneus' own marked copy of the *Systema* was also before him, and he had the literary and historical assistance of Dr. B. Daydon Jackson in his researches. The following are among the suggested changes given, some of them worked out in considerable detail, so intricate was the argument required to substantiate the proposed alteration.

Papilio sinon, Poda, for *P. podalirius*, L.; *Papilio podalirius*, L., for *P. feisthameli*, Dup.; *Euchloë belia*, L., for *E. eupheno*, L.; *Apatura iris*, L., for *A. ilia*, Schiff.; *Apatura pseudoiris*, Ver., for *A. iris*, auct.; *Charaxes jason*, L., for *C. jasius*, L.; *Argynnis esperi*, Ver., for *A. adippe*, auct.; *Satyrus hermione*, L., for *S. alcyone*, Schiff; *Satyrus major*, Esp., for *S. hermione*, auct.: *Epinephele janira*, L., for *E. jurtina*, L.; *Epinephele janira* var. *jurtina*, L., for var. *fortunata*, Alph; *Lycaena idas*, L., for *L. argyrognomon*, Bergstr.; *Lycaena ramburi*, Ver., for *L. idas*, Ramb. Many varietal and aberrational names are also compromised in the suggested alterations.

Since "some of these have been the object of long controversies among entomologists, owing to insufficient original descriptions, and others reveal mistakes which have been carried on for over a century and a half, and which 'are' so thoroughly rooted by habit that nobody ever suspected their existence," they can well be refused validity, and we hope that this matter will be dealt with, at any rate by the National Committee in the British Islands. Some of the suggestions will possibly have to be accepted; *Argynnis niobe* var. *eris* is the "nymotypical" form, since the Linnean description of *niobe* fits the Linnean labelled specimen which has been subsequently called *eris*. Hence it is the type form and *eris* drops. Unless of course the argument prevails that when with such common species, 150 years of literature and records exist with the old nomenclature, it is more convenient to allow the old inaccuracies to remain in the interests of future reference and research.

Perhaps some one competent to discuss the minutiæ of this paper will do so in a future number.

The collections of the late Mr. A. H. Clarke, F.E.S., of Earl's Court (see vol. xxiii., p. 256), have recently been presented to the University of Leeds by Mrs. Clarke. The cabinets contain some 6,500 specimens from the Continent as well as from the British Isles, and will form a particularly valuable reference collection on account of its general completeness. In addition there are some 6000 specimens of Exotic butterflies, which will form a most useful introduction to the Fauna of the different regions of the globe. We also understand that the working library of entomological literature belonging to Mr. Clarke, is included in the donation. We congratulate the University upon the acquisition of so much that will be of value to the Zoological side of the work of the Institution.

In the current number of the *Pomona Journal of Entomology*, henceforward to be known as the *Journal of Entomology and Zoology*, is a monographic article by J. C. Bradley on the *Siricidae* of North America, with five plates of species and details, carefully worked out keys to the genera and species (males and females), and a considerable amount of Bibliography. The genera are *Sirex*, *Urocerus*, *Xeres*, *Tremex* and *Teredon*. Our *juvencus* (*noctilio*) is a species of the genus *Sirex*, the American form having the varietal name *cyaneus*. Our *gigas* is a *Urocerus* and is not found in North America.

We quote from the *Entomological News*, June, 1913, p. 277, a statement which we thoroughly endorse. "One of the crying needs of descriptive entomological, and in fact of all zoological, work, has been that of a standardisation of colours—the necessity for a uniform set of terms having a fixed chromatic value which could form a basis for colour-description and comparisons." A work dealing with this subject, entitled *Colour Standards and Colour Nomenclature*, has been written by Robert Ridgway, Curator of the Division of Birds, United States National Museum, with many plates of Eleven Hundred and Fifteen Named Colours, after twenty-six years of "thorough study of the subject from every standpoint." We have not seen a copy of this work, but the technique of the plates is said to be excellent, each colour having been done in large sheets which were cut up into squares to be placed on the plates. This work should prove of inestimable value in all descriptive work.

The question of *E. ligea* and *E. euryale* is again discussed in the *Verhandlungen der k. k. zool.-bot. Gesellschaft in Wien*, pt. 1-2., 1913, by D. H. Zerny, from the point of view of the androconial areas of these two species and var. *adyte* in the large amount of material from all the main mid-European localities and from Scandinavia in the Vienna Hofmuseum. He considers that *E. ligea* and *E. euryale* are quite separate species, but that regarding the form *adyte* a confusion has arisen. The *adyte* of Hübner he concludes is a form of *E. euryale*, but the specimens so named coming from Norway, and very similar in appearance, are a form of *E. ligea*, and, he remarks, want a varietal name. In the same part are two figures of var. *turcica* ♂ and ♀ of *Melanargia galathea*, and upper and underside of *Melitæa aurelia* ab. *corythalina*, a form not often figured, together with another named form of *Parnassius apollo*, *viz.*, var. *transsylvanicus*. *Erebia christi* is analytically compared with *E. epiphron* var. *valesiana* by Herr Schwingenschuss, giving both the distinctions which are quite constant and those which may vary to a more or less definite amount.

In the *Berlin Ent. Zeit.*, 1912, pts. 3 and 4, just issued, there are figures of two aberrations: (1) *Papilio podalirius*, in which the transverse bands are partially suppressed and otherwise indistinct, band 3 being represented only by a large spot; and (2) of *P. machaon*, in which the outer third of the cell of the hindwing is strongly emphasised in black and having a transverse black line across the cell, leaving an enclosed yellow oval. In the same number is a contribution by Dr. Paul Schulze on the variation shown in *Drepana lacertinaria*, with a plate of twelve figures. The forms noted are as follows:—

Drepana lacertula, gen. æst. *erosula* (=*aestiva*), the summer brood.
,, ,, var. (et ab.) *scincula*, the Lapland form.
,, ,, ,, ,, ab. *interpres*, like the first generation in colour and markings.
,, ,, ,, ,, ab. *conjuncta*, the two transverse lines approach below the discoidal spot.
,, ,, ,, *brykaria*, the Finland form.
,, ,, ,, ,, ab. *dimidiata*, larger in size.
,, ,, ,, *tacoraria*, the Kentish form, small.

There is also a long article on the "vexed question" *Erebia euryale* and *E. ligea* which requires much further consideration than a mere notice, in view of what has been done recently in breeding from the egg, the crossing of Lapland and Alpine forms, and comparing of long series of local races from many localities.

We have received the *Report of the Rugby School Natural History Society* for 1912, and note that it is the forty-sixth issue. The Society does most praiseworthy work in training its members in scientific methods, interesting them in varied branches of science, putting them in the way of obtaining a knowledge of what has been done and what remains to be done, and making them accustomed to use mutual confidence and mutual aid in the furtherance of what they aim at. The Society is divided into sections each with its special study; Botanical, Entomological, Geological, Zoological and other branches each have their devotees, varying in number from year to year, but carrying on faithfully the work and traditions of their predecessors. The present secretary is Mr. D. A. J. Buxton, who is one of our occasional contributors, and who with his brother Mr. P. A. Buxton gave an account of a holiday in Greece some twelve months ago in the pages of this magazine. There is an extensive list of the Lepidoptera observed near Rugby in 1912, together with similar lists of the Neuroptera, Trichoptera and Coleoptera. In these lists all observations which have not been verified in some reliable way are queried. This is as it should be; an example of strict scientific accuracy. We congratulate the Society which has had successively such members as Messrs. A. F. Hemming, P. A. Buxton, F.E.S., and D. A. J. Buxton.

Our contributor, Mr. W. Parkinson Curtis, F.E.S., sends us a copy of a paper by himself read before the Bournemouth Natural Science Society "On Order and Method in forming Collections." It is roughly divided into two sections, one dealing with Entomological, the other Avian Collections, although the former contains many details, etc., that apply to both, such as labelling and recording, upon which he lays particular stress. He points out that all serious workers must use both dissecting tools and microscope extensively, and remarks how often variation is indicative philogenetically.

We have just received the fourth and concluding portion of the *Catalogue of the Lepidoptera of Northumberland, Durham, and Newcastle-on-Tyne.* This work was commenced by the late J. E. Robson of Hartlepool in 1899, when part I., containing the Rhopalocera, Bombyces, Sphingids and Noctuids was issued. The Geometrid portion appeared in 1902, and the Tortrices in 1905. After this date Mr. Robson's health became too precarious to allow close continuous work, and, subsequently to his death in 1907, the remaining M.S. passed into the hands of his friend and co-worker John Gardner, F.E.S. The latter gentleman has at length completed the last section devoted to the Tineina and Pterophori. It has been a tedious and difficult task owing to the few workers in the group and the often uncertain determination of the captures. The part contains some 200 pages and includes a photograph of the late author with an appreciative memoir. The original notes were all made under the supervision of Mr. R. Bankes of Corfe Castle, the arrangement "failing any generally accepted sequence" of species, is that of Stainton's *Manual.* There is a long list of additional species recorded for the district by the editor. It is somewhat a pity that the nomenclature of the species contains all the altered names of the Staintonian period and not the original appellatives to which we have in the main returned during the last few years. The editor has done his work very carefully and given all contributors their full acknowledgement both for opinions and facts. The complete work forms a standard book on the district comprised and should be a great stimulus for further work.

The Annual Report of the Lancashire and Cheshire Entomological Society generally contains a few papers of an informative character of more than local interest. The present Report for 1912, just to hand, is in no way behind its predecessors in this respect. Mr. H. St. J. Donisthorpe contributes a very valuable paper, "Some Remarkable Associations between Ants of Different Species." Mr. Donisthorpe gives a table by Emery, with additions of his own, which comprises many species of ants associated with others in various ways and for various reasons, and subsequently deals in detail with most of the included species. Mr. Claude Morley contributes a long paper on "Ichneumons" in its extended sense, dealing generally with the whole of the parasitical Hymenoptera, referring to the technical details and characters necessary for the study of these insects, and to many of the most interesting life-histories of species typical of the various families. Not the least interesting item in the Report is the personal reminiscences of the late Life-president of the Society, Samuel James Capper, by Mr. F. N. Pierce, containing as it does autobiographical notes on incidents and active members of the Society. In the Council's Report we read that our old friend Mr. Mansbridge will soon have the first part of the Local List of Lepidoptera ready for press, and that Mr. Pierce's "Genitalia of the British Geometræ" is rapidly approaching completion. The accounts for the year show a balance of £25. We never like to see more than a nominal balance, believing that the members are entitled each year to have their "money's worth" from a Society. In this case, however, there is a definite object in accumulating the balance, a praiseworthy object too, *viz.*, to publish the Local List we have referred to above.

The Volume of the *Natural History of the British Butterflies*, which was left unfinished by the late J. W. Tutt at his death, is gradually approaching completion. Part XV. has just come to hand containing the remainder of the Life History of *Aricia medon* (*astrarche*). Two further species of which the notes are in hand have to be dealt with, *viz.*, *Lycaena arion* and *Hamearis* (*Nemeobius*) *lucina*. If any of Mr. Tutt's numerous collaborateurs have details of these two species in their hands, the Rev. George Wheeler, who is kindly arranging the matter for the press, would be pleased to receive them as soon as possible.

SOCIETIES.

THE SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.—*March 27th*.—DONATION.—Mr. B. H. Smith gave two specimens of *Phryxus livornica* to the Society's collection. C. EXULIS.—Mr. R. Adkin exhibited several specimens of *Crymodes exulis* from Shetland

and from Inverness to show the characteristics of the two races. PHOTOGRAPH.—Mr. Colthrup, a further series of his photographs of insects at rest and of the eggs of shore birds in nature. BALKAN LEPIDOPTERA.—Mr. A. E. Gibbs, a number of Nymphalids especially of the genera *Argynnis* and *Melitaea* taken by him in the Balkans in the summer of 1912, including *Dryas pandora*, *Argynnis adippe* ab. *cleodoxa*, *Issoria lathonia*, *Brenthis hecate*, *Melitaea trivia*, *M. athalia* var. *mehadiensis* and ab. *navarina*, *Neptis lucilla*, *Polygonia egea*, etc., with *Chrysophanus alciphron* and *Libythea celtis*. SICILIAN LEPIDOPTERA.—Mr. J. Platt Barrett, a number of species of Sicilian butterflies, including *Melanargia japygia*, *M. pherusa* and var. *plesaura*, *M. galathea* and vars. *lucasi*, *procida* and *syracusana* and discussed other allied forms; he also showed a series of *Euchloë damone*. PUPA OF L. ARION.—Mr. W. J. Kaye exhibited the pupa of *Lycaena arion* found by Mr. Percy Richards in 1908 in an ant's nest in a frail cocoon. ABERRATION OF E. CARDAMINES.—Mr. F. W. Frohawk, a form of *Euchloë cardamines* in which the discoidal spots of the forewings were considerably within the orange apical area.—*April* 10*th*. S. FAGARIA.—Mr. Buckstone exhibited living larvæ of *Scodiona fagaria* (*belgiaria*) from Oxshott. ABERRATION OF HYBRID BETWEEN EPHYRAS.—Mr. Newman, a remarkable aberration of a hybrid between *Ephyra annulata* ♂ and *E. pendularia* ♀, in which the outer half of all the wings was melanic. PAPER ON THE BALKANS.—Mr. A. E. Gibbs read a paper entitled "Through the Balkans with a Camera" illustrating his remarks with a number of lantern-slides of views and scenes in Bosnia and Hercegovina where he made a collecting tour in 1912.—*April* 24*th*.—SPECIAL EXHIBITION.—The evening was devoted to a SPECIAL EXHIBITION of specimens of Orders other than Lepidoptera and was a most successful meeting. BOOKS, ETC.—Mr. R. Adkin, on behalf of Mr. R. Armstrong Adkin, exhibited series of the shells of the Molluscs *Helix hortensis* and *H. nemoralis* in considerable variety and a long series of *H. aspersa* from the chalk near Eastbourne. He also showed an original copy of *A Naturalist's Calendar*, 1795, being extracts from Gilbert White's diaries, and a facsimile reprint of Gilbert White's *Flora Selborniensis*, issued by the Selborne Society in 1911. Also he exhibited a spider's web and spider mounted between glass by the late Mr. H. McArthur. THE SOCIETY'S COLLECTIONS.—Mr. W. West (Greenwich) placed on the tables sixteen drawers of the Society's reference collections (British), *viz.*, two of Orthoptera, presented by Dr. Malcolm Burr, etc., two of Neuroptera, presented by Mr. W. J. Lucas, Mr. W. J. Ashdown, etc., one of Hymenoptera and eleven of Coleoptera. Mr. West also exhibited twelve drawers of his own collection of British Heteroptera, Homoptera and Psyllina. NEW AND RARE COLEOPTERA.—Mr. E. A. Newbury, a number of new and rare species of British Coleoptera including *Apion selousi*, *Trachyphloeus digitalis*, *Lathrobium ripicola*, *Homalota aquatilis*, *Myrmecopora brevipes*, *Thinobius pallidus*, *Cartodere argus*, *Dermestes peruvianus*, *Bledius denticollis*, *B. filipes*, *B. sacerdendus*, *Centhorhynchus parvulus*, *Laccobius purpurascens*, *Orthochoetes insignis*, etc. Mr. Priske, varied series of *Helix nemoralis* and *H. aspersa* from Seaton, Devon, and the varied forms of the Coleopteron, *Geotrupes mutator* from Hanwell. SWISS HEMIPTERA AND HYMENOPTERA.—Mr. Ashdown, examples of the species of *Hemiptera* and *Hymenoptera* taken by him in Switzerland, including *Cicadetta montana*, *Aelia acuminata*, *Harpactor iracundus*, *Mutilla europaea*, etc. FIREFLIES.—Mr. Sheldon, two species of "fire-fly" met with on the continent and the eggs of the migratory birds Redwing and Fieldfare obtained by him in Lapland. HEMIPTERA RESEMBLING LEPIDOPTERA, AND AUSTRALIAN INSECTS.—Mr. Hy. J. Turner, Homoptera from S. America resembling Lepidoptera in form and marking, including the beautiful *Poeciloptera phalaenoides*; Heteroptera of bizarre form and marking from Columbia, etc., including *Apiomerus hirtipes* with two curious processes ("flags") at the anal extremity of the abdomen; two large-bodied Orthoptera from the Transvaal used as food by the natives; and a box of large and conspicuous insects from the up-country of Western Australia, Aculeata, Diptera, Ichneumonidæ, Odonata, etc. SCORPIONS, ETC., AND FLASHING OF FIRE-FLIES.—Mr. K. G. Blair, living Scorpions, Earwigs and Glowworms from Monaco, and gave his experiences in the States of the "flashing" of the fire-flies, and an account of the experiments there carried out with artificial "flashing." HEMIPTERA AND COLEOPTERA.—Mr. Buckstone, insects of various orders from New South Wales. Mr. Main, two species of cockroach and a large glowworm, etc. Mr. Ashby, Hemiptera and Coleoptera from Oyo, Southern Nigeria and his collection of *Donacia*, *Chrysomela*, and *Cryptocephalus* (Coleoptera). DESTRUCTIVENESS OF THE SAWFLIES S. GIGAS AND S. NOCTILIO.—Mr. Gibbs exhibited a case containing specimens of *Sirex noctilio* and *Sirex gigas*, the saw-flies whose larvæ cause much damage to fir timber, and examples of the damage caused. He also showed a case of the various groups of the Sub-Order Hemiptera, and gave notes on the two exhibits. FOREIGN ORTHOPTERA AND VARIOUS IMMIGRANTS.—Mr. H. Moore, two drawers of Orthoptera, one mainly European, the other large exotic leaf crickets; a box of *Xylocopidae*, Violet Carpenter-bees from all over the world; a case of Lantern-flies, *Fulgoridae*; foreign insects introduced to Deptford by shipping, such as *Blabera cubensis*, *Acheta bimaculata*, *Acridium aegyptium*, etc.; and a selection of Orthoptera and Homoptera to illustrate a note on "Singing Insects." THE WITCHES-BROOM.—Mr. Andrews, specimens of "Witches Broom" fungus-gall, *Ascomyces* sp.? on willow, and types of 63 species of Diptera taken in the months of March and April chiefly at sallow blossom. A SERIES OF PLANT-GALLS AND DRAWINGS.—Mr. Coxhead, specimens of plant-galls and some very beautiful water-colour drawings of the same, and the gall fly *Uromyces ficariae* under the microscope. COLLEMBOLA.—Mr. West (Ashtead), four species of Collembola under the microscope. EXOTIC PHASMIDS, MANTIDS, GRYLLIDÆ, ARACHNIDS, ETC.—Mr. Edwards, large and conspicuous species of *Phasmidae*, *Mantidae*, *Gryllidae*, and *Hymenoptera*, chiefly from British North Borneo, together with the remarkable Chelifer, *Thelyphenus lucanoides*, and the curious Arachnids, *Actinacantha arcuata* and *Gasteracantha vittata*. *May 8th.*—Mr. E. B. Haynes of Wimbledon was elected a member. EREBIA ZAPATERI.—Mr. H. E. Page exhibited a short series of *Erebia zapateri* taken by him in Spain and which he was placing in the Society's cabinet. "SINGING" CRICKETS.—Mr. Hugh Main, two living field-crickets from Lisbon in the curious cage in which they are kept for "singing." One specimen gave an exhibition of his power in the room. LARGE AFRICAN

Saturniids, etc.—Mr. J. Platt Barrett, two fine Saturniids from Nairobi. S. Tyrol rhopalocera.—Mr. Sich, Rhopalocera from the S. Tyrol, *P. machaon*, *P. podalirius*, *Libythea celtis*, *Scolitantides orion*, *Glaucopsyche iolas*, etc., and read a paper entitled "Spring in the South Tyrol." *May* 22*nd*.—Epinephele jurtina.—Messrs. Edwards, West (Ashtead) and Carr, pale blotched examples of *Epinephele jurtina*: Mr. Adkin, a series from various British localities some near var. *hispulla* and one ab. *splendida*: Mr. Gibbs, a series from Algeria Corsica, Balkans, Vosges, Jura, etc., including var. *hispulla*, var. *fortunata*, var. *taurica*, etc., and short series of other species of the genus, *E. janiroides*, *E. ida*, *E. pasiphaë*, *E. tithonus*, with many vars. and aberrations; Mr. Hy. J. Turner, a series from Portugal, Spain, Pyrenees, Teneriffe, Hyères, Corsica, Algeria, Crete, Greece, Turkey, Switzerland (many places), Niederwald, Juras, French Alps, etc. Colour photographs.—Mr. Main, colour photographs of *Tephrosia crepuscularia*, taken by himself. L. carpinata with green flush.—Mr. Tonge, bred series of *Lobophora carpinata* from Tilgate Forest; two specimens were distinctly green tinged. Paper.—Mr. Turner read a paper entitled "One of our common butterflies, *Epinephele jurtina*," showing the growth of our knowledge of the species from the time of Linnæus, 1758, and the consequent growth of the nomenclature.—*June* 12*th*.—Infested tobacco.—Mr. R. Adkin exhibited tobacco leaves that were much infested by a species of beetle, which was afterwards identified as *Anobium paniceum*. The tobacco came recently from Turkey. A new Hemipteron, Psylla albipes.—Mr. West (Greenwich), a series of the new Hemipteron, *Psylla albipes* discovered by him on white-beam tree. Galls on blackthorn.—Mr. Coxhead, blackthorn leaves with galls of the Dipteron, *Cecidomyia pruni*, from Shooter's Hill. Aberration of A. grossulariata.—Mr. Cowham, an aberration of *Abraxas grossulariata* with the black markings on the forewings coalesced to a wide band suppressing the usual yellow markings. Stag-beetle larvæ.—Mr. H. Moore, larvæ of the stag-beetle, *Lucanus cervus* from Lewisham. Rare beetles.—Mr. Blenkarn, a series of *Bruchus pisi*, a Coleopteron found by Mr. Main in split-peas in a Woodford shop, and a pair of the rare *Pterostichus parumpunctatus* taken at Chopwell, Northumberland, in May, 1912. Reports.—Several reports were made of the occurrence of *Colias edusa*, *Pyrameis atalanta*, and *P. cardui*.

Entomological Society of London.—*March* 19*th*, 1913.—Messrs. Thomas Alfred Coward, F.Z.S., Brentwood, Bowdon, Cheshire; Wm. H. Edwards, Natural History Dept., Birmingham Museum; Lewis Gough, Ph.D., Entomologist to the Govt. of Egypt, Dept. of Agriculture, Cairo; John Hewitt, B.A., Director of the Albany Museum, Grahamstown, South Africa; Carlos E. Porter, C.M.Z.S., Professor of Zoology, Agricultural Institute, Santiago, Chile; and Gilbert Storey, Entomological Research Commission, Natural History Museum, South Kensington, S.W., were elected Fellows of the Society. Coniopteryx Larvæ.—Mr. C. B. Williams exhibited two larvæ of *Coniopteryx tineiformis*, eight of which were beaten from pines at Oxshott on the 16th inst. The genus Eciton and Myrmecophiles.—Mr. Donisthorpe exhibited various species of ants of the Genus *Eciton*, the "Wander Ants," and gave some account of their interesting habits. He remarked that a number of Myrmecophiles run with them on their wanderings. Ants from the United States and from Switzerland.—Mr. W. C. Crawley exhibited a few ants collected during September, 1909, in Pennsylvania and Cleveland, Ohio, and some species collected with Dr. Forel in Switzerland, August, 1912. The Rev. F. D. Morice made the following exhibits by means of the Epidiascope:—1. Lantern-slides showing the pectinated antennæ of the ♂ in the Sawflies *Lophyrus pini*, L., and *Monoctenus juniperi*, L., the latter new to Britain and not yet recorded. 2. Lantern-slides showing paradoxical (secondary sexual) characters in the legs of numerous ♂ Aculeates (Bees, Wasps, and Fossors). 3. Microphotos of the apex of the ♀ "terebra" in *Cimbex lutea*, L., and *Cimbex femorata*, L. 4. Entomological Congress groups at Oxford and Tring. (Lantern-slides). During the course of this exhibit, Dr. Chapman, at Mr. Morice's request, explained the manner in which he had seen the wings of the ♀ *Odynerus spinipes* imprisoned between the tridentate middle femora and excavated middle tibiæ of the ♂. A paper by Mr. H. Eltringham, M.A., F.L.S., "On the Scent-apparatus of *Amauris niavius*, L.," was read by the author, the black-and-white drawings by which it was illustrated being thrown on the screen. —*April 2nd*, 1913.—Messrs. André Avinoff, Liteyny, 12, St. Petersburg; W. Bowater, Russell Road, Moseley, Birmingham; J. S. Carter, Warren Hill Cottage, Eastbourne; James Davidson, M.Sc., Imperial College of Science and Technology, South Kensington, S.W.; Arthur H. Foster, M.R.C.S., L.R.C.P. (Eng.), M.B.O.U., Sussex House, Hitchin; J. A. de Gaye, King's College, Lagos, South Nigeria; Oliver Hawkshaw, 3, Hill Street, Mayfair, W., and Millard, Liphook; and Ernest Edward Platt, 403, Essenwood Road, Durban, Natal, were elected Fellows of the Society. The Rev. G. Wheeler explained that he had been mistaken in some of his observations on *Argynnis auresiana* on October 16th, 1912. The name *auresiana* was given by Fruhstorfer not by Oberthür, and a few specimens were already known before Mr. Powell discovered it in numbers at Lambessa as previously stated. It had also been figured by Turati. Transfers of Butterflies.—Mr. E. Ernest Green exhibited cards showing the transferred wing-scales of butterflies. A Northern Locality for Tetramorium cæspitum.—Mr. Donisthorpe exhibited a specimen of *Tetramorium caespitum*, L., ☿, from a colony found by Mr. Evans on the Bass Rock in Scotland, March 21st, 1913; the most northern records known in Britain were Denbigh in Wales, and Cambridge and Suffolk in England. Ants from Egypt.—Mr. W. C. Crawley exhibited numerous species, sub-species, etc., which were taken at Helonan during December and January last. Dr. Jordan gave a short account of the Zoological Congress at Monaco, with special reference to Entomological Nomenclature, and thanks were voted to the Society's Delegates for their work at the Congress, and to Dr. Jordan in particular for his interesting and satisfactory account of it. The following papers were read:—"On the classification of British *Crabronidae* (*Hymenoptera*)," by R. C. L. Perkins, D.Sc., M.A., F.L.S. "Descriptions of new species of the Syrphid genus *Callicera* (*Diptera*)," by the late G. H. Verrall, F.E.S. Edited by J. E. Collin, F.E.S. "Neue Pyrgotinen aus dem British Museum in London," Von Friedrich Hendel, Wien.

Lancashire and Cheshire Entomological Society.—Meeting held at the Royal Institution, Colquit Street, Liverpool.—*March 17th*, 1913.—Professor Robert Newstead, F.R.S., M.Sc., of the Liverpool School of Tropical Medicine, delivered a lecture entitled "The Bionomics and Morphology of some Blood-sucking Flies." Mr. Newstead dealt in his usual lucid and thorough manner with the life-cycle of representative species of the genus *Glossina*, or Tsetse flies, which convey sleeping sickness to man and "ngana" to cattle, the species incriminated being *Glossina morsitans* and *G. palpalis*. The lecturer also described *Stomoxys calcitrans*, a world-wide species, and a common stable-fly in Great Britain, which is strongly suspected of being concerned in the transmission of trypanosomes. A very interesting life-history was that of *Simulium*, whose larvæ live in rapidly running, shallow streams, and, lastly, the minute midge, *Phlebotomus papatasii* (Fam. *Psychodidae*), found commonly on the Mediterranean littoral, and elsewhere in subtropical and tropical countries, which carries the "three days" fever from sick to healthy persons, was described. Mr. Newstead, having visited many different parts of the world to investigate the life-cycles of these insects, and having himself discovered many important facts concerning them, was able to give a vividness to his remarks that no mere book knowledge could have done. The lecture was illustrated by blackboard drawings and microscopic preparations showing the structure and anatomical details of the insects mentioned above. Further exhibits by Mr. Newstead were two specimens of *Glossina severini*, Newst., a new species recently recognised from the Congo Free State, and a specimen of the very rare *G. fuscipleuris*, Austen, also a wasp, *Bembex forcipata*, that has only recently been found to store its larva cells with the tsetse fly; this exhibit comprised nine flies from a single cell together with the wasp. The university collection of bloodsucking flies was also on view, containing practically all the known species and many types. Mr. F. N. Pierce exhibited the genus *Acidalia* as at present arranged and also as it falls into two distinct groups when classified according to the genitalia. Mr. C. E. Stott sent for exhibition a specimen of *Thyreocoris scaraboides*, a chalk Hemipteron picked up on the shore at Blackpool.—*April 21st.*—New Members.—Messrs. Alan Cookson, Blundell Sands, and Alfred Watts, Oxton, were elected members of the Society. Address.—Mr. R. Wilding gave an address entitled "Notes on some rare and local Coleoptera," in the course of which he gave details of the haunts and habits of the following species, viz.:—*Miscodera arctica*, *Amara rufocincta*, *Bembidium 5-striatum*, *B. nigricorne*, *Cymindis vaporariorum*, *Perileptus areolatus*, *Ocypus fuscatus*, *Quedius auricomus*, *Pseudopsis sulcatus*, *Heptaulicus villosus*, *Ægialia rufa*, *Ammaecius brevis*, *Anisotoma ciliaris*, *A. rugosa*, *Anthicus bimaculatus*, *Antherophagus silaceus*, and *Chrysomela cerealis*. Mr. Wilding exhibited series of all these species in illustration of his remarks. A discussion ensued on the bionomics of the less known species occurring on the sandhills, from which it appeared that a good deal of research is still required, especially in connection with the larval habits. Exhibits.—Mr. Alfred Watts exhibited two specimens of *Heliaca tenebrata* captured by himself near Birkenhead. Mr. W. Mansbridge showed *Epinephele jurtina* (*janira*), *Adscita statices*, and *Polyommatus icarus*, all very brightly coloured, from Co. Cork; also *Boarmia repandata* from Huddersfield. Mr. F. N. Pierce brought a box of Micro-lepidoptera chiefly *Tortrices*, from various localities, which he had obtained as material for working out the genitalia.

REVIEWS AND NOTICES OF BOOKS.

The North American Dragonflies of the Genus Aeschna. By E. M. Walker. 213 pp.+28 plates. Published by The Librarian, The University Library, University of Toronto. Price $2.00.—This volume—the advent of which deserves a warm welcome—treats of those species found only north of Mexico. It forms the eleventh brochure of the "University of Toronto Studies," and appears to be an exhaustive and complete piece of work. In addition to studying the material from public museums (including the British Museum) and large private collections, the author has been able to observe most of the eastern species treated of, and in such cases descriptive notes of the colour-pattern and drawings have been made from the fresh material. Dealing with the Taxonomy of the Genus, the following points are noted:—Generic characters of the adult. Generic characters of the nymph. Secondary sexual characters. Characters of Specific value and Terminology:—(*a*) Imago—Colour-pattern. Genitalia, (i.) Accessory Genitalia of Male; (ii.) Genitalia of Female. (*b*) Nymph—Measurements and Abbreviations. Genetic Relationships of the Genus *Aeschna*. The Sub-family *Aeschninae*. The *Aeschna* Group.

Then, Climatic Variations are treated of, as well as the Colour Variation of the Female and the Geographical races. Under General Life History we get the sub-heads:—Season of Imaginal Life; Length of Imaginal Life; Habitat; Influence of Weather Conditions; Migrations; Seasonal Variation in Number of Individuals; Food; Enemies; Mating Habits; Copulatory Position; Comparison of Copulatory position with that of other Odonata.

From this concise list of "Contents" the scope of the work is at once seen. In addition there is a liberal supply of plates, well executed by the Heliotrope Co., Boston. The volume should have a place in the library of all students of this Order.—H.E.P.

The Macro-lepidoptera of the World, Vol. II., The Palæarctic Sphinges and Bombyces, 56 coloured plates (2849 figures). By Dr. Adalbert Seitz, Stuttgart. Price £2 5s. (Messrs. Kernen, Stuttgart, Germany.—At the end of 1911, we reviewed the first volume of this monumental work, and now we have before us Vol. II, while seven others are in course of being issued in parts, of which two are nearly completed, one containing the Palæarctic Noctuids. The section now under review consists of 480 pages (100 more than in the preceding one), and contains 56 coloured plates, most of which are very well produced, but a few of those of the genus *Zygæna* and its allies are not quite what they should be. For these latter the present publishers are not responsible. To those entomologists who have not easy access to some large collection these plates are of the utmost use, not only for identification of species in hand, but to show all related species side by side, to illustrate the sum total of a genus, and generally to broaden the views of the student.

Dr. Seitz himself contributes a portion of the text, the remainder being written by various specialists in their own groups, including Dr. K. Jordan, Dr. E. Strand, Dr. K. Grünberg, Dr. P. Denso, Hon. Walt. Rothschild, Messrs. W. Warren, M. Bartel, R. Pfitzner, etc. This list of names ensures that in the condensation of facts to form the letterpress, everything of prime importance for the object of the work should be inserted and that it should be quite up-to-date as to the latest observations and results. One item, which is certainly unique in works of this kind, is a detailed summary of Sphingid hybrids with plates by Dr. P. Denso, who is so well known as an ardent student in this branch of research. In his introductory remarks Dr. Seitz notes that he uses the name Bombyces in no scientific sense, but as a useful comprehensive term to indicate those groups of Lepidoptera-Heterocera not belonging to the Sphingids, Noctuids, Geometers, or Micros.

In the arrangement of the matter one paragraph is given to each form which is considered to be a species, and included are all the named varieties of the species with the more common and conspicuous aberrations. But the author states that he has omitted from the text a large number of names of aberrations, the inclusion of which would have enormously increased the bulk of the work without proportionately increasing its usefulness to the general student. We can quite understand this latter statement, when we recall to mind that *Parnassius apollo* has elsewhere credited to it considerably more than one hundred named forms, and that this list is constantly increasing. As regard the nomenclature, the author has kept "essentially to the law of priority," and has given only the absolutely necessary synonymy. The genera are used as a rule in a wide sense, just as in Vol. I. *Enodia* and *Hipparchia* were suppressed in *Satyrus*, and *Melampias* in *Erebia*. This is not so in all groups; in the difficult Family, *Psychidæ*, for instance, the detailed subdivision into genera is given, probably because these species are of much older ancestry than the other included groups, and hence they fall into the more disconnected and fragmentary sections, which must be indicated by named genera.

In the introductory remarks we are informed that subsequent to the completion of the sixteen volumes containing the various families, a further volume will be issued, Vol XVII., which will contain articles on the Physiology, Biology, and Preservation of Lepidoptera, besides the addenda of species added to the various fauna during the progress of the work. This volume will be extremely useful in many ways, although we question whether space should be given to the consideration of Preservation a subject treated at length in all elementary works. We think the space might be better employed. For instance, we should like to see the opinions of the various authors as to classification, unified in the last volume. Three different authors have so far written on the *Satyridae* with the result that there are three quite different arrangements of the genera in the Palæarctic, Indo-Malayan and American Volumes, and we suppose there will be a fourth in the African Volume. Presumably this occurs in the other families and one would like to see an attempt made to unify these arrangements into probable phylogenetic relationships, which may give the generalising student something definite upon which to base his arguments and studies, rather than the four groupings made irrespective of one another.

Every Natural History Library of any pretence and all Lepidopterists should get these volumes on the Palæarctic Fauna. Nothing so comprehensive and so well illustrated has ever been produced before. The low price is quite incommensurate with the amount of information. —H. J. T.

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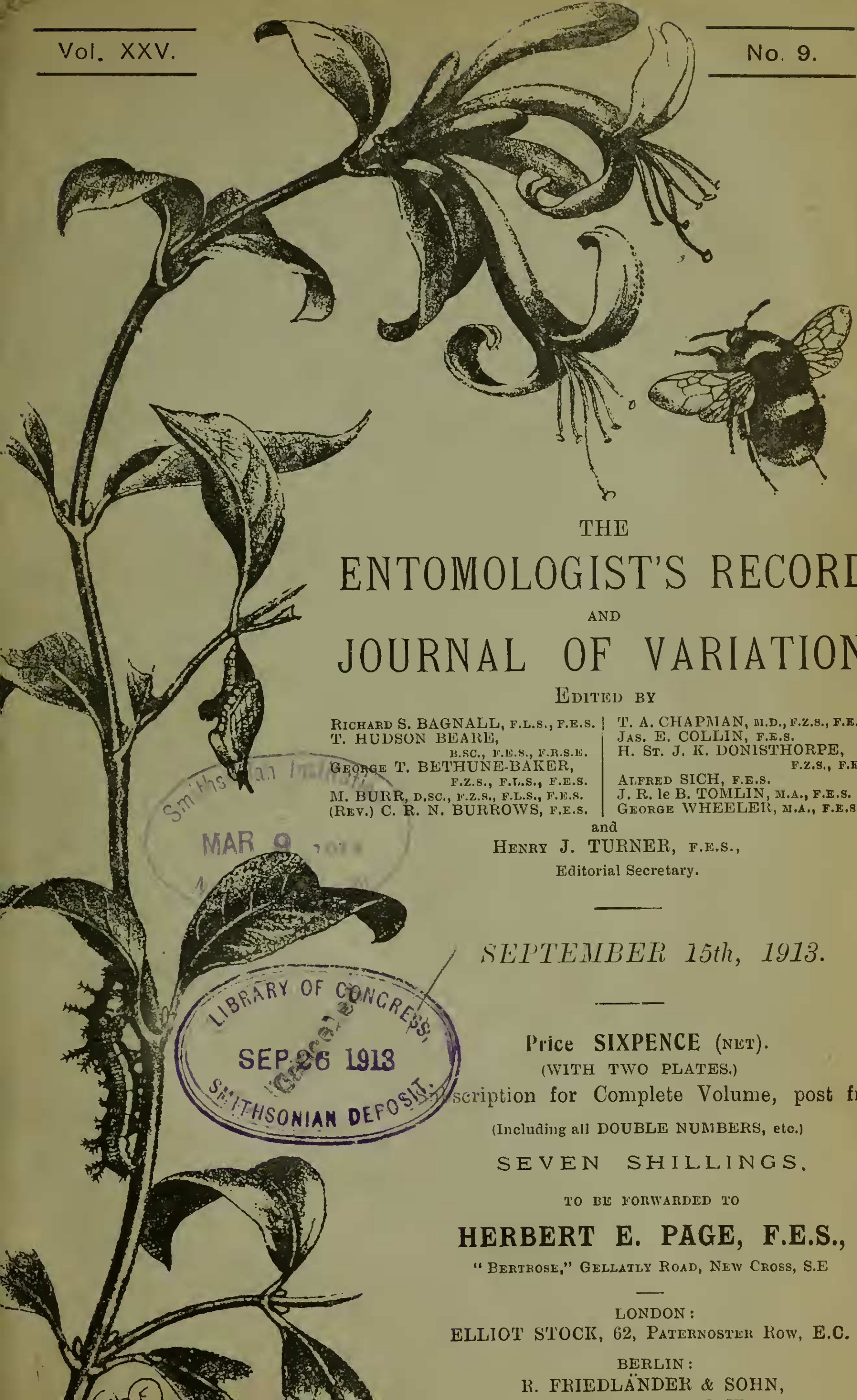

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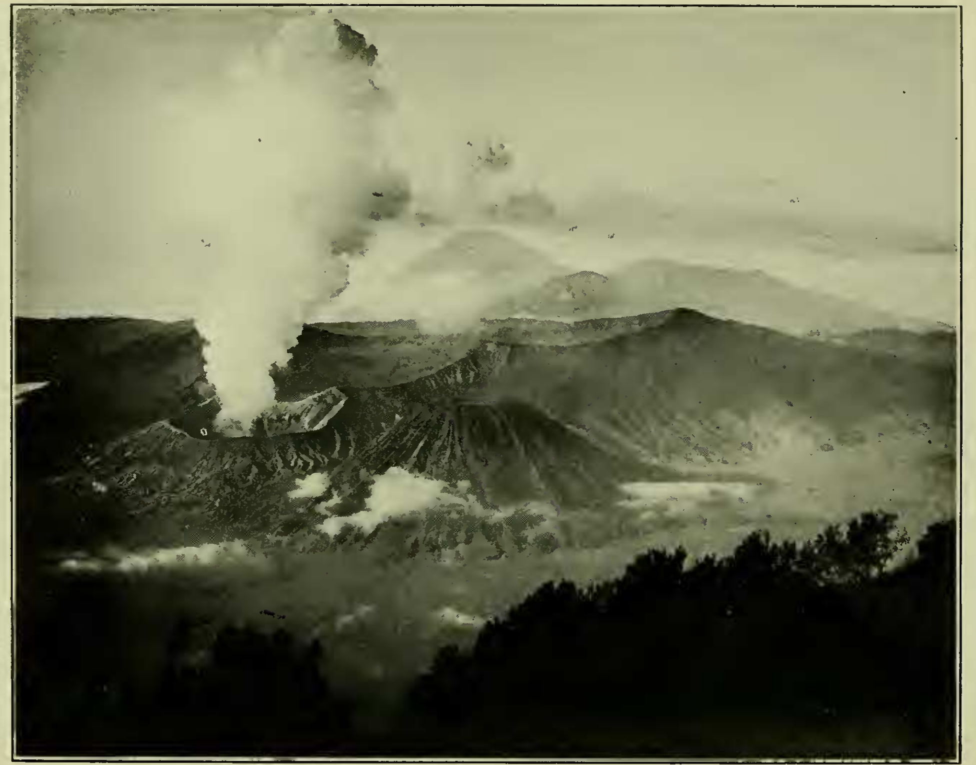
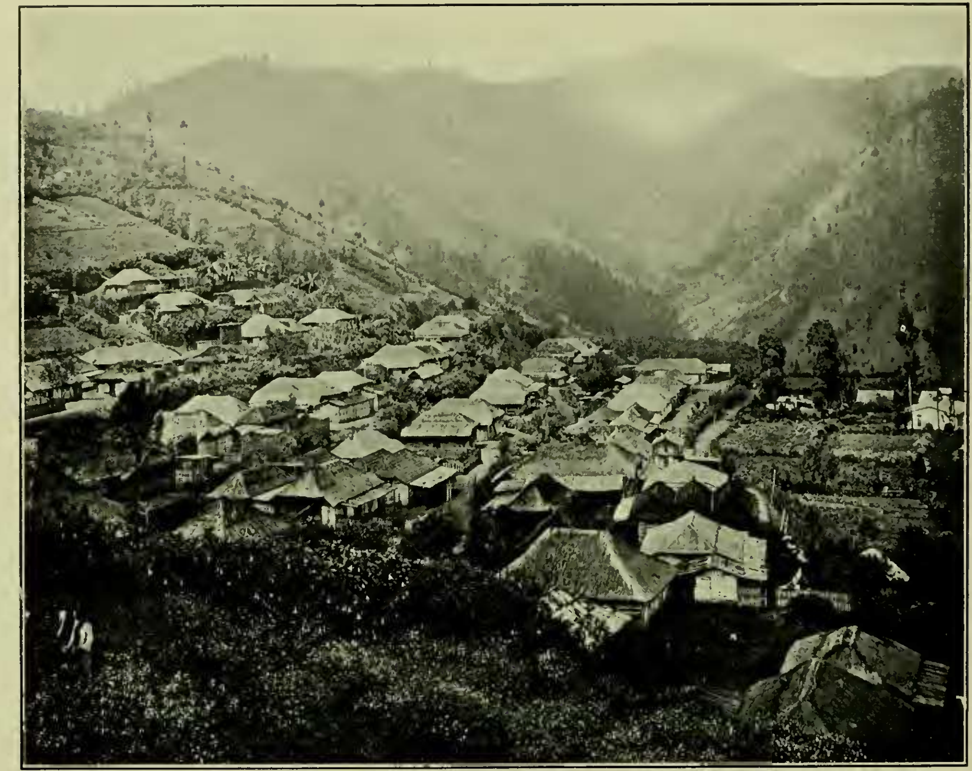


The Sand Sea with
Bromo and Semeroe
Tengger Mountains,
East Java.

By the courtesy of
Messrs. Kurkdjian,
Sourabaya, Java.



Tosari.
A typical
Tenggerese village.
6,000 ft. elevation.

By the courtesy of
Messrs. Kurkdjian,
Sourabaya, Java.

Collecting among the volcanoes of Eastern Java. (*With two plates.*)

By Dr. E. A. COCKAYNE, F.E.S.

The volcanoes of Western and Central Java, with their wonderful cloak of virgin forest, have been described by many writers, notably by Wallace in his classical work, *The Malay Archipelago*, in which he gives an account of his ascent of the Gedeh and Pangerango. The drier volcanic mountains of the East end of the island have been far less frequently visited, and are comparatively little known except to the Dutch. It is true that both Wallace and Doherty visited the outlying Arjoeno, but neither appears to have collected on the main mass of the Tengger volcanoes. Their appearance and the character of their vegetation is so unlike anything I saw in Ceylon or Celebes, the only two other equatorial islands I visited, and their entomological wealth is obviously so great, that I think an account of my brief stay at Tosari in July, 1910, may interest others, and better still perhaps stimulate them to go out of their way to pay a longer and more profitable visit to the locality. I can assure them it would be made enjoyable by the ease and comfort of travel, and by the courtesy and ready help afforded by the Dutch, civilian or official.

Leaving the damp heat of Soerabaya at 8.12 in the morning, I travelled by train through the fertile coast plains with their rich crops of rice, tobacco, and sugar cane, to Pasaroean, where I arrived about 9.30. Here I hired a pony and cart and was driven to Pasrepan, along a broad road lined by grand avenues of tamarind, kanari, and teak trees. Amongst the many fine insects seen on this part of the journey were two *Attacus atlas*, on the underside of a huge banana leaf. They were the first I had seen at rest by day. After narrowly escaping disaster in a collision with a cart heavily laden with cut sugar-cane and drawn by two large bulls, I reached Pasrepan and changed into a smaller cart, in which the long ascent up the lower slopes of the Tengger Mountains was made as far as Poespo. This part of the road is bounded all the way by hedges of lantana, a flowering shrub always frequented by tropical butterflies. My slow ascent was enlivened by the sight of great numbers of *Precis iphita* var. *horsfieldi*, *P. erigone*, Cram., the intermediate form, *P. asterie*, crowds of representatives of the genus *Catopsilia*, and the abundant yellow *Terias libythea*, innumerable "blues," and the less frequent but more brilliant spectacle of a deep purple *Euploea*, probably *Salpinx leucostictus*, or a huge orange-tipped *Hebomoia glaucippe*. At Poespo the road becomes too steep for carts, and the rest of the journey, taking about 2½ hours, is performed on a small but hardy native pony. The vegetation during the ascent gradually changes in character as more and more temperate forms replace the tropical and appear amongst the exotic shrubs and graceful tree-ferns. Above Poespo the road at first runs through extensive coffee plantations growing in the shade of forest trees crowned with clusters of huge red blossoms and inhabited by numerous bands of monkeys.

In the shady parts hundreds of the dull brown Satyrid, *Sadarga nala* were noticed, and many of the beautiful Lycænid *Ilerda epicles*, whose wings are splashed with orange and purple, were flitting about the edges of the road. The swift low flight of *Catopsilia scylla* gave one a glimpse of its white forewings and brilliant orange hindwings as it crossed and recrossed the sunnier spaces, and once I saw the flash of the metallic green spots on the hindwings of the gorgeous *Papilio arjuno* var. *tenggerensis*. Here, too, I caught *Hypselis vera* and both sexes of *Symbrenthia confluens* var. *javanus*. Both sexes of the former and the male of the latter closely resemble a brown *Neptis* as they rest on the extremity of a branch, but their flight is much swifter; the female *Symbrenthia*, in Java, resembles the common black and white *Neptis leucothoë*, though elsewhere it is brown and black like the male.

Mounting higher and higher we left the coffee plantations behind and reached the steep bare slopes and deeply cut ravines of the Tengger Mountains. Their forests have all been cut down long ago and no trees have been left, except here and there a fine old tjemara (*Casuarina*) tree with graceful tamarisk-like foliage. Many young ones have been planted recently by the Dutch, but have not yet had time to alter the somewhat barren aspect of the hills. Every available piece of ground is cultivated, chiefly with Indian corn, the staple food of the natives, replacing rice, which, it is said, they vowed never to eat again after they were driven from the plains by the victorious Mohammedans. Cabbage and other homely vegetables are also grown in great quantities to supply the cities of the plain. In the late afternoon I arrived at the Sanatorium Tosari, a comfortable hotel, built on a small plateau in the style usual in this country, and lying nearly 6,000 feet above sea level. It consists of low pavilions, one containing the public rooms, the others the bedrooms, each opening independently on to a broad verandah. The drawing-room was upholstered in red velvet and made a quaint contrast with the bedrooms, which were furnished in a style suited to the tropics, but its brilliant lights were most attractive to moths at night, though, but for the rules of the hotel by which the lights were all turned out at 10.30, the number of interesting species taken would have been much larger.

On the morning after my arrival I left the hotel at 4 a.m. to see the active volcano. My journey up the steep slippery path, so steep in parts that it is cut in steps, mounted on a small pony and guided by a native torchbearer, was by no means lacking in excitement. We reached the edge of the crater at 6 a.m. and had breakfast. To the geologist this is a most interesting region. The summit of the mountain is formed by an enormous, almost perfect crater four or five miles in diameter. It is no longer active, and its floor is formed by sand and volcanic debris, the "sand sea." In the centre of this four small volcanic cones have been erupted at different times and form a complex group. The nearest, the Batok, is an almost perfect cone, and looks so bare and uniform that it appears to be artificial. The active volcano, the Bromo, lies behind, and is half hidden. It is always pouring out smoke, and the dull roar from its crater was clearly heard. All the trees on the steep sides of the main crater, here called the tjemara-lawang (gate of the spirits), are scorched, though they lie nearly two miles from the Bromo. When I reached this, the "sand sea" was full of white mist, above which peeped the Batok and the other craters. Beyond the far side was the sharp cone of the Semeroe volcano (12,000 feet high), which is also in constant eruption. As the sun rose, the mist gradually melted away, and huge clouds of white smoke rolled out of the Bromo, whilst from the summit of the Semeroe puffs of deep orange-coloured smoke shot up every few minutes and gradually drifted away. I led my pony down into the "sand sea," and riding across to the Bromo, walked up the steep slope to the summit, which lies only 714 feet above the level of the "sand sea." This, however, is itself between 8,500 and 9,000 feet above sea level. The vegetation is very scanty, and consists chiefly of coarse grass; in fact, the sand is so sparsely covered that mirages are of frequent occurrence. The rough slopes of the wall of the main crater support a much richer vegetation. There are a good many tjemaras and mimosas, and there is a thick herbaceous undergrowth, from which I disturbed so many moths that I determined to visit it again next day on foot and armed with my net. I discovered that the time each day for collecting butterflies would be very short. For although almost every morning begins at sunrise with a cloudless sky, and the hills stand out sharp in the clear air, at about 10 o'clock clouds form on the sides of the mountains and gradually increase, spreading upwards and downwards, until the whole summit is enveloped in a vast mass of clouds which does not disperse till sunset. At first it is too cold for butterflies to fly, and, just as they are fully on the wing, the first wisps of damp cloud appear, and soon a fine drizzling rain begins, and lasts from about midday till late afternoon.

As I had decided, I left the hotel at 7.30 a.m. the next morning, and soon saw four species of Lycaenid, *Lampides boeticus*, *Catachrysops strabo*, Fabr , *Euchrysops cnejus*, Fabr., and a large form of *Zizera otis*, the first named being much the commonest. Climbing a little higher I met with dozens of *Pyrameis cardui*, rather small, but otherwise typical, and saw multitudes of their larvæ feeding on a species of *Artemisia*. At about 7,000 feet *Argynnis niphe* var. *javanensis* was seen, the males of which are much smaller and paler than those met with in Ceylon. The female, with its white apical band, closely resembles *Danais chrysippus*, of which it is generally accepted to be a mimic. But though I took the species on numerous occasions in Java and Ceylon, where I also saw hundreds of the Danaid, and was more than once deceived by mistaking the *Argynnis* for the Danaid, I never saw the two species in the same locality; the *Argynnis* prefers a different kind of country, and lives at a much greater elevation. In Japan, where the fritillary is met with, the *Danais* does not exist. The male *Argynnis* flies swiftly and low down over the grassy banks, the female is slower on the wing, but both love to rest with wings expanded on the path. On the whole I am inclined to regard this as one of those cases of accidental resemblance, of which many other wonderful examples could be collected. It is misleading, because the geographical range of the two species is closely similar. The white apical band is common to many groups of Nymphalines and is probably ancestral. These curious accidental resemblances must occur, owing to the strictly limited range of size of Lepidoptera and of possible colours and patterns, but it must not be thought that my remarks are intended to cast any doubt on the theories of mimicry, which are far too well founded to be shaken by the necessity of discarding one commonly quoted example.

Somewhat higher is a more level stretch covered with tjemara trees and with a carpet of pink flowered brambles, and it was in this part that I first saw the big black and white Danaine butterfly *Mangalisa albata*. It was not common, and flew high in the air. Apparently it likes the bare open summit of the crater as much as the woodland, and on the Gedeh and Kawah Manoek, further West, it flew in the thickest parts of the virgin forest. Resting on the plants under the tjemaras a large and handsome long-winged *Abraxas confluentaria*, Warr., was common, which Doherty took on the neighbouring volcano, the Arjoeno, while on their trunks was an occasional worn Boarmiid, and two specimens of a *Cidaria* were taken. Beyond this wood is the loveliest display of flowers which I saw in the tropics. There is a shallow valley with here and there a rough mass of volcanic rock. A few small tjemaras and mimosas break its monotony, but the whole valley is blue with the gigantic Bromo forget-me-not; here and there the large yellow blooms of a big St. John's wort afford a striking contrast. A tall green spurge is common, and a herbaceous plant six or eight feet high, with flowers stiff-petalled like the everlasting flower, brackens, and an occasional tree-fern, were seen. Other large and showy plants grew here, amongst them one with orange flowers, and a yellow-blossomed leguminous plant. Amongst the smaller plants I noticed a species of dead nettle, a buttercup (*Ranunculus*), a violet (*Viola*), a pale yellow *Calceolaria*, a beautiful blue-flowered leguminous plant with a clover-like leaf, a *Thalictrum*, and sorrel and dock (*Rumex*). In spite of all the flowers, butterflies were very scarce, and I only saw one additional species, the pale blue *Cyaniris akasa*, much the shape of *C. argiolus*, but with black tips to the forewing in both sexes. Many were drinking at the damp patches on the path. Further on a stream crossed the path, and along its course grew clumps of giant nettle ten feet high, and near them *Pyrameis dejeani* was abundant. The species is like *P. atalanta* in markings, but the white and red are replaced by a dark cream, and the black by dark brown. It flies swiftly, but does not travel far, and often settles on the path with wings spread in the sunshine, and when it rains a good many can be found at rest on the upper side of the nettle leaves. The larva was quite common, living singly in a closed-up leaf, and though I failed to find a pupa, I shook out an imago whose wings had not yet begun to expand. The larva is much like the darker form of *P. atalanta*. Wherever the banks were steep and covered with long grass and rough herbage, Geometers were abundant, especially near the crater wall. The vast majority proved to be the very variable *Xanthorrhoë ludifica*, Warr., and one *Dysstroma citrata* (*immanata*) was caught, and a conspicuous moth with shining deep brown forewings and pale straw-coloured hindwings, with a sharp cut black border, *Photoscotosia multiplicata*, Warr., was common, and easily disturbed. Here, too, I caught a fine brown and white *Deilemera*, a species unrepresented in the British Museum, and a small semitransparent Syntomid, a species also hitherto undiscovered and since named *Callitomis phaeosoma*, Hmpsn. Later I took two more near the hotel. It is much like *Callitomis dohertyi*, first discovered by Doherty on the Arjoeno, but the abdomen is black instead of yellow. The group is common in Java and I found another new species, *C. multicincta*, Hmpsn., with white spots on the forewings and a yellow ringed abdomen, on the summit of the Kawah Manoek volcano near some pools of boiling mud. The other days I was there I caught scarcely any more species, but every night at the lamps in the hotel I made many additions to my captures. Night work; in this locality would undoubtedly repay the entomologist. The paths are in many places protected by posts and wires, and sugaring would be an easy matter, but I think a sheet and lamp would bring in a richer harvest. Even in the hotel moths swarmed, and, like the vegetation, they gave one strange contrasts for temperate and tropical genera and species. Amongst the commonest were *Agrotis* (*Axylia*) *putris* and *Cirphis* (*Leucanea*) *extranea* (=*unipuncta*), whilst a species *C. albicosta* near *C. albipuncta* was equally abundant, and the ever present *Sphinx convolvuli* was common.

Amongst other species the following were taken, for the identification of which I am greatly indebted to Sir George Hampson and Mr. Prout, but many still remain unnamed.

RHOPALOCERA:—Nymphalinæ: *Pyrameis dejeani*; *Argynnis niphe*. Euplœinæ: *Mangalisa albata*, Zinck-Sommer. Acræinæ: *Telchinia vesta*. Lycænidæ: *Lycaenopsis* (*Cyaniris*) *akasa*; *Lampides boeticus*, Lin.; *Catachrysops strabo*, Fabr.; *Euchrysops cnejus*, Fabr.; *Zizera otis*, Fabr.

HETEROCERA:—Sphingidæ: *Sphinx convolvuli*. Nolidæ: *Celama phoeochroa*, Hmpsn.; *Celama mesomelana*, Hmpsn. Syntomidæ: *Callitomis phaeosoma*, Hmpsn. Lithosiidæ: *Asura calamaria*, Moore; *Miltochrista euprepia*, Hmpsn.; *Miltochrista scripta*, Walk. Noctuidæ: *Claridea assulba*; *Agrotis conspurcata*; *Agrotis puta*; *Agrotis* (?) *dahlii*; *Polia pannosa*, Moore, subsp. *sikkima*; *Cirphis albicosta*; *Cirphis extranea* (*unipuncta*); *Eriopis chloridia*, Green; *Conservula v-brunnea*, Green; *Acrapex prisca*, Walk.; *Acrapex* (?) *brunnea*, Hmpsn.; *Acrapex leucophaebia*; *Sesamia inferens*; *Xylostola indistincta*, Moore; *Amyna glaucopora*, Hmpsn.; *Borotia* (?) *stellata*; *Borotia* (?) *renalba*; *Sinna calospila*, Walk.; *Plusia orichalcea*, Fabr.; *Plusia confusa*, Moore; *Ericeta inangulata*. Sarrothripidæ: *Sarrothripus grisea*, Hmpsn.; *Blenina quinaria*, Moore; *Risoba prominens*, Moore; *R. viridescens*, Hmpsn. (n.sp.). Saturniidæ: *Loepa katinka*, Westw. (a large male). Eupterotidæ: *Eupterote testacea*, Walk. Limacodidæ: a species not in the British Museum. Lasiocampidæ: a species not in the British Museum. Hypsidæ: *Argina argus*, Koll.; *Deilemera* sp. (?). Lymantriidæ: *Euproctis oreosaura*, Swinh.; *Euproctis*, n.sp.

GEOMETRIDÆ:—Amongst others were the following:—Hemitheinæ: n.gen., n.sp.; *Diplodisma obnupta*, Swinh; *Timandra punctinervis*, Prout, n.sp.; *Erythrolophus bipunctatus*, Warr. (or n.sp. allied to it); *Ptychopoda* two (?), (n.sp.); *P. delicatula*, Warr. (subsp. of *holosericeata*); *Sauris* (?), n.sp.; *Photoscotosia multiplicata*, Warr.; *Dysstroma citrata*, L., var. *cuneifera*, Warr.; *Xanthorrhoë ludifica*, Warr.; *X. sordidata*, Moore.; *Ziridava palpata*, Walk.; *Eupithecia eupitheciata*, Guen.; *Eupithecia*, n.sp. (?); *Nadagara* (?), two n.sp.; *Luxiaria contigaria*, Walk. (common); *Luxiaria* (?), n.sp.; *Tephrinopsis parallelaria*; *Tephrinopsis* (?), n.sp.; *Boarmia acaciaria*, Boisd.; *Boarmia* (?), sp.; *Urapteryx pluristrigata*, Warr.

In Andalusia—March and April, 1913.

By ROSA E. PAGE, B.A.

Mr. Page and I little thought, on quitting Spain last August, that within a year we should be returning thither; but the opportunity having presented itself, March 15th found us on our way to Andalusia, well primed with notes and sketches (for which we are greatly indebted to Mr. W. G. Sheldon), and, of course, expecting a glorious month among the Spanish forms of spring Lepidoptera, which should have been in full force during March and April.

Andalusia itself, though extremely interesting to the student of history, was, I must confess, a little disappointing to us entomologically, for, cultivation being evident everywhere, the amount of suitable ground for insects of any sort is strictly limited to the Sierras, though, indeed, we did see an odd specimen or so of *Pararge egeria* in the Parque Maria Luisa at Seville.

At Malaga, on March 24th, we worked up the small stream referred to by Mr. Sheldon in his charming article describing his visit to Andalusia, and then, diverging to the west of the mountain, examined both sides of the stream, continuing past the upper farms guarded by sundry "ferocious dogs," of which we had been warned, and which are said to be a necessity owing to the vicious propensities of the ubiquitous gipsies. The day was sunny, but a cool light breeze was blowing landwards, and later on, cloudy periods intervened. On the previous day a violent wind and thunderstorm had raged. As to whether the season were late, the weather at fault, or the goats were grazing too thoroughly, we were uncertain, but insects were very scarce, although generally distributed throughout all the slopes examined: we found, indeed, all the species expected, but only in ones or twos. These were as follows:—

Thestor ballus: both sexes; generally distributed, and the most common of all the species seen; about 50% were cabinet specimens; their low and rapid flight causes them to be very inconspicuous when on the wing, and when settling they are well protected by their velvety-green undersides.

Thais rumina: ♂s and ♀s in good condition; rather wild in the wind, and fond of flying over banks just out of one's reach.

Epinephele pasiphaë: two ♂s just out.

Euchloë euphenoïdes: one ♂ in splendid trim.

Gonopteryx cleopatra and *Pyrameis cardui:* both hibernated specimens, the latter worn and small.

Pararge egeria: one or two flitting round gardens of villas in the suburb of Caleta.

Colias edusa: fairly frequent; worn and small.

Glaucopsyche melanops: a few, mostly worn.

On the 27th, we tried the lower hills nearer Caleta and got among vineyards, where, although the day was somewhat hotter, we found fewer insects still. *Thais rumina* occasionally sprang up from the bare upturned soil among the vines and fruit trees, difficult ground on which to follow them up; and a few *Anthocharis belia* were flying at a great rate up and down the slopes. A couple of *Papilio podalirius* ab. *feisthamelii* were noticed in gardens in Caleta, both out of reach.

After our experiences at Malaga, we hardly knew what to think of our chances at Granada, but "hope burns eternal" in the entomologist's heart, and we put our bad luck down to the goats. We were only able to collect here on one day, April 2nd, a delightful morning being spent near the Genil River, from which we had fine views of the Sierra Nevada, a long snow-covered ridge with a single peak standing above the rest, the celebrated Vega (irrigated valley) lying at its feet. The spring tints were everywhere most beautiful; cherry and peach trees were loaded with delicate blossoms which freely opened their petals to the balmy air as if secure from the intrusion of rude winds and frost in that sheltered spot. The ground on which we were working, however, proved to be rough, stony and unproductive, and goats were again much in evidence. Some *Anthocharis belia* and *Pontia daplidice* var. *bellidice*, a large proportion of which were worn, were pairing and settling on a bed of very dark blue flowers of the leguminous order (probably a crop of some kind), as well as on the leaves of almond trees; in both these situations they were much easier to follow than when scudding through the gorges and up and down the grassy slopes. A few *Colias edusa*, in good order, were flying in one spot, and odd specimens of *Colias hyale*, *Scolitantides baton* var. *panoptes*, *Pieris rapae*, ♀ *Polyommatus alexis* ab. *icarus* (a lovely form), *Coenonympha pamphilus*, *Rumicia phlaeas* and *Papilio machaon* were captured. All these, even in units, are extremely interesting forms.

In the afternoon the weather broke up; we awoke next morning to find a snowstorm in progress, and cold unsettled weather continued until we left, on April 4th, for Ronda, a very cold journey in an unheated train, the mountains *en route* all covered with snow. This did not augur very well for Ronda, and, indeed, finding no hope of collecting there, although the ground appeared free from goats, we went on to Gibraltar, leaving all our apparatus at Ronda. We were greatly surprised to find the Rock basking in brilliant sunshine during our stay. There was, however, no collecting to be done, the only Lepidoptera seen being a few *Thais rumina*, very small in comparison with those from Malaga, and mostly worn, together with one or two worn *Pyrameis cardui* and a very fresh looking *Pyrameis atalanta*. The 9th found us back at Ronda, this being our last day there, as we were leaving for home next morning. We had very reluctantly resigned ourselves to returning with practically nothing. But the 9th was to be the best day of the holiday. One felt on rising that it was to be a collecting day; the clear sky, brilliant sunshine, the balmy air tempered by a cool breeze, revived our exhausted hopes; towards the forenoon, however, clouds gradually gathered, and the collecting ground was in shadow for the rest of the day. On arriving at the pinewood opposite Ronda, there were the *Anthocharis tagis*, *A. belia*, together with a few *A. belemia*, flying along the edge and up and down the precipitous slopes, settling on lavender flowers of a very deep-blue variety, or on cistus, the white flowers of which were just opening, so that they were much more inconspicuous on these plants than on the lavender. Standing on the top of the cliff, one could net them as they glided up; if missed, they generally went on and down the other slope, but did not return, as did two or three worn *Papilio podalirius* ab. *feisthamelii*, which had a habit of whizzing past one, returning again and again after being struck at and missed. As the morning advanced insects were in fuller force, generally distributed over all the ground. Of other species there were only a few; a single richly-hued *Euchloë euphenoides* flitting down the face of the cliff, several brilliantly-coloured *Gonopteryx cleopatra*, one or two *Callophrys rubi*, their green underwings glittering in the sun, one *Eugonia polychloros*, one *Thestor* *ballus*, a few worn *Pararge megaera* and *Pyrameis cardui*, while half-a-dozen *Thais rumina* rustled out of the grass at our approach, and were easily caught. The sandflies had evidently not yet emerged, but there were many bees about, and also plenty of lizards.

With the greatest regret, we left Ronda, and turned our faces in the direction of home, to find that bad weather had been general throughout the whole of the Peninsula as well as in the West of Europe generally; crossing the Guadarramas, the snow lay thickly in the pinewoods, and in patches reached even to the railway line. No doubt, although we only had two really bad days during the month, there was something in the meteorological conditions that was uncongenial to insect-life, affecting it even in Andalusia.

Review of Field Work in 1911.

By RICHARD S. BAGNALL, F.L.S., F.E.S. (*Hope Department of Zoology, University Museum, Oxford*).

During the year 1911 my opportunities for field-work and entomological study were few, and yet the results were more than satisfactory.

As President of the field section of the Natural History Society of Northumberland, Durham, and Newcastle-upon-Tyne, I made a point of not only attending each meeting—sometimes at considerable inconvenience—but of devoting such time as I could to one group of Arthropods, of which little was previously known as regards the local (and indeed the British) fauna and distribution. Happily, I chose the Myriopods, partly on account of the interesting features—so suggestive of *Campodea*—seen in *Scolopendrella*, of which I gathered some hundreds of specimens.

With the exception of a few hours in the New Forest and at Blackgang Chine in the Isle of Wight on the occasion of the British Association Meeting at Portsmouth, my collecting outside field meetings was practically confined to the immediate vicinity of my late home in Penshaw, Co. Durham.

In my Presidential Report to the Society I remarked that altogether the year had been an extraordinarily fruitful one, the additions to the local fauna numbering somewhere between two and three hundred, and the additions to the British fauna being summarised as follows :—One order (PROTURA, Silvestri), four families (*Acerentomidae*, Silv., and *Eosentomidae*, Berlese, in the *Protura*, *Brachypauropodidae*, Hansen in the *Pauropoda*, and *Brachychaeteumidae* (nov.), Verhoeff, in the *Diplopoda*, several genera, and about sixty species, of which thirteen or fourteen were new to science.

It may prove interesting to make a brief resumé of these captures.

Myriopoda.—The Myriopods, of which over sixty local species were met with, may be taken in their four divisions, the main additions being made by a special study of the small creatures comprising the orders *Pauropoda* and *Symphyla*.

PAUROPODA.—For a long time the two species described by the late Lord Avebury remained alone as British. We now know six in the North, of which *Brachypauropus lubbocki*, Bagnall*, is the first British representative of the *Brachypauropodidae*.

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* *Trans. Nat. Hist. Soc. of Northumberland, Durham and Newcastle*, n.s., vol. iv., pp. 59-60, 1911.

Symphyla.—The classical *Scutigerella* (*Scolopendrella*) *immaculata* of Newport remained until recently the sole representative of its kind in this country. In my synopsis* I am able to bring forward thirteen species, many of which have since been found in other localities. *Scutigerella spinipes*, Bagn., *S. biscutata*, Bagn., *S. hanseni*, Bagn., *Scolopendrella dunelmensis*, Bagn., *S. horrida*, Bagn., *S. delicatula*, Bagn., and *S. minutissima*, Bagn., are described as new.

Diplopoda.—I was particularly fortunate in stumbling across several interesting species of Millipedes proper, the additions (not a few of them quite conspicuous creatures) to the British list being as follows:—*Brachychaeteuma bagnalli* (gen. et sp. nov.), Verhoeff, from Gibside, a blind "square-backed millepede," which Verhoeff makes the type of a new family†; the little white Polydesmid, *Titanosoma jurassicum*†, Verh., in numbers from a Wear Valley dene, and sparingly from other parts of the country; *Polydesmus coriaceus*, Porat, from Moles' nests, County Durham; *Microchordeuma* sp. (? *silvestre*), from Gibside; *Isobates varicornis*, C.L.K., from Durham and Northumberland; *Napoiulus* sp. (? *palmatus*, Némec), from a Wear Valley dene, with *Titanosoma*, and the little prettily-marked var. *perplexa* of *Glomeris marginata* from Gibside and Teesdale‡. *Titanosoma jurassicum* was previously only known from a single ♀ found on the Danube, in 1910; it would seem to be parthenogenetic.

Chilopoda.—Two specimens of *Lithobius* from Gibside were identified by Mr. Edv. Ellingsen of Kragerö, with some hesitation as *L. nigrifrons*, Haase, an addition to the British fauna. It is necessary to obtain more material.

Ectoparasites.—Perhaps the most interesting piece of work attempted during the year lay in the commencement of a study of the Arthropod ectoparasites of the birds and mammals of the North of England, by Mr. Wm. Hall, of Fatfield, County Durham, and the writer. At the end of the year we had listed 4 ticks, including the recently described *Ixodes caledonicus*, Nuttall, from a starling; 28 different fleas, including *Trichopsylla dalei*, Rothsch., in numbers from house-martin's nests; *T. vagabundus*, Wagn., (*insularis*, Rothsch.), from cormorants; *Typhlopsylla dasycnemus*, Rothsch., *T. pentacanthus*, Rothsch., and *Ctenopsyllus spectabilis*, Rothsch., from small mammals; 5 Hippoboscid flies, including the light green *Oxypterum pallidum*, Leach, from the swift; 6 bloodsucking lice (*Anoplura*) from various mammals, and 84 or more bird-lice (*Mallophaga*). This latter material is forming the subject of a series of notes appearing in the *Journal of Economic Biology* and includes 30 or more species not, at that time, recorded as British. In connection with the study of bird-lice, I am of opinion that much remains to be done as regards those that affect the commoner birds; for instance, many of our most interesting discoveries were from birds such as the commoner gulls, cormorant, teal (an apparently new *Trinoton*), starling, blackbird, swift and chaffinch, and I attribute the reason for this to the fact that workers in the Mallophaga have secured their material chiefly from Zoological Gardens, ornithological friends and poulterers, and thus the ecto-parasites, of the rarer birds and game birds have become better known to us than those affecting the common birds.

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* *loc. cit.*, n.s., vol. iv., pp. 17-41, pl. i., and text figures, 1911.

† *Zool. Anzeiger*, vol. xxxviii., p. 445., 1911, and *Trans. Nat. Hist. Soc., Northumberland, Durham, and Newcastle*, n.s., 1912.

‡ *Zoologist*, July, 1912.

Protura.—In 1907 Prof. F. Silvestri* diagnosed an order of curious primitive creatures, apterous and without eyes or antennæ, the *Protura*, which stands alone in the Insect World. The Italian species have been beautifully monographed by Berlese†, who regards them as a new Order of Myriopods, the *Myrientomata*. I have had the pleasure of discovering species of the three diagnosed genera falling into the two families of the order, the *Acerentomidae* and *Eosentomidae*, and now that my time can be largely devoted to Zoology, I hope at no distant date to work out our British forms. The species are not really uncommon and are also widely distributed ; I have found them in several localities from Dundee southwards.

Apterygota.—In 1910 I collected a good deal of new material in the order *Collembola* (Springtails), including numerous additions to our list, which I have not yet had the opportunity of bringing forward. In 1911 I scarcely did anything in this group with the exception, perhaps, of making other records of some of the species met with in 1910, such as the Neelids, *Megalothorax minimus*, Willem., and *Neelus murinus*, Folsom, the equally tiny *Micranurida pygmaea*, Axels., the curious *Tetracanthella shötti*, Wahl., *Tullbergia quadrispinus*, Börn., *T. krausbaueri*, Börn., *T. calipygos*, Börn. and others.

Thysanoptera.—I cannot conclude this brief review without a few words on my favourite insects, the thrips or *Thysanoptera*, although I was unable to do as much work in the group as in previous years. Two recently described species, *Amblythrips ericae*, Bagn., and *Bagnallia agnessae*, Bagn.,‡ were taken in new localities, including numerous examples of the previously unrecognised male of the latter ; Mr. H. S. Wallace, F.E.S., discovered an interesting new species (*Physothrips latus*, Bagn.) at Whitfield, Northumberland, whilst Prof. Karny has shown that the large elm-leaf thrips taken by myself in the Derwent Valley and Teesdale differs from the type of *Liothrips hradacensis*, Uzel (in the Vienna Hofmuseum), to which I had referred the species; it must now be known as *Hoodia bagnalli*, Karny.§ At the Harbottle week-end meeting of the Northumberland and Durham Natural History Society, which I noted in this Journal, *Chirothrips hamatus*, Trybom (*dudae*, Uzel), *Frankliniella tenuicornis*, Uzel, *Bagnallia klapaleki*, Uzel, and *B. dilatata*, Uzel, were recorded as new to the British fauna. One of these, *C. hamatus*, was taken later at Matley Bog in the New Forest, where Mr. C. B. Williams and I had the pleasure of discovering *Cephalothrips monilicornis*, Reut., an insect I had anticipated would be found to occur in our country.

Collecting Rhopalocera in France, 1913.

By E. B. ASHBY, F.E.S.

This year I left London on the afternoon of June 6th by the 2.10 p.m. train, which enabled me to reach Clermont-Ferrand (via Paris), in the Auvergne district, the next morning at 6.29. After breakfast

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* *Boll. Lab. Zool. Gen. e Ag. Portici*, Vol. I., p. 296.

† *Redia*, vi., 1909.

‡ *Journal of Economic Biology*, Vol. VI., pp. 1-11., 1911.

§ *Trans. Ent. Soc.*, 1912.

I had time to see the magnificent cathedral before leaving the Place Lamertine, in the centre of the city, by the steam tramway for Puy de Dome. In early June the first train does not start until 10.15, and though the line was open to the summit, I contented myself with booking to the station La Font de l'Arbe, which was reached about 11.0. There I started working the lower slopes of the Puy de Dome. Unfortunately the day was windy, and not too sunny, and possibly because I was too high up for the date, I only succeeded in getting about two dozen insects, the best species being *Brenthis euphrosyne*. As it was very close and threatened thunder in the early afternoon, I left La Font de l'Arbe shortly after 3.0 p.m., and reached Clermont-Ferrand Station in time to catch the train to Perpignan and Villefranche, in the Pyrenees Orientales, at which latter place I arrived at noon the next day. From here one is conveyed by a good service of motor cars to the Hotels at Vernet-les-Bains, a distance of about three-and-a-half miles uphill. The hotels at Vernet are all under the same management, and one has the run of all their grounds. I stayed at the Hotel des Bains Mercador, which I found most comfortable and quite reasonable.

After lunch I set out "on the prowl," working up the valley of the river Cady, on the road to Casteil. The day was fine and the sun very hot, conditions which continued during my stay at Vernet. Only a few insects were taken this first afternoon, but they included two fine male examples of *Papilio podalirius* var. *feisthamelii*. It was the first occasion of my meeting with this form, and I was greatly interested in seeing how much they were attracted to the damp patches on the mountain roads round Vernet, occasioned by the overflowings of the irrigation streams in the farmers' fields; again and again did this insect return to its feast after being disturbed by passers-by. I worked up to Casteil, a quaint little mountain village with its tiny church, and got as far as the Ravine de Saint Martin.

On June 9th I walked to Casteil, and after passing through the village and crossing the river, pursued the road parallel to the Jou torrent for about two hours until I reached two "cortals" (mountain shelters for the shepherds and their flocks), where I turned to the right to ascend up to the tower of Goa, which stands so conspicuously on the hill-top. Around the tower I again found *Papilio podalirius* var. *feisthamelii*, with *P. machaon* and *Pyrameis atalanta*, all three pursuing one another with avidity, as is their wont on high ground, but *Loweia alciphron* var. *gordius*, which occurs there, was not yet out. It was a hot and tiring journey, but repaid one for the trouble. Between Vernet and the tower of Goa, I found that *Aporia crataegi* was much the most common insect, although its predominance seemed likely to be questioned very shortly by *P. podalirius* var. *feisthamelii*, which daily appeared in increasing numbers. I took *Scolitantides orion* during the day and a fine specimen of *Arctia villica*.

On the following day I collected in the Valley of Saint Vincent, which is best approached through the winter garden at the back of the Hotel des Bains Mercador, from the top of which descent is easily made into the road. I went up the road as far as the Cascade des Anglais, a very pretty spot, and here again *P. podalirius* var. *feisthamelii* were both numerous and very fresh. More *Scolitantides* *orion* were taken, together with *Colias edusa* (1 ♀), *Thais rumina* var. *medesicaste* (1 ♂), *Euchloë euphenoides*, etc.

The next day, June 11th, I again went up the long winding path to Casteil, and thence on to the monastery of Saint Martin du Canigou. It was somewhat of a disappointment as I found but very few insects on account of the date being too early, as I was assured by a French peasant that there were "grands papillons" around the monastery. I obtained more *P. podalirius* var. *feisthamelii*, a fine *L. aliphron* var. *gordius* just emerged, and some "blues" in good condition.

On June 12th, I ascended the hill through the pine woods immediately behind the same winter gardens, and after some time came out by the Cascade de Dieterichs, a spot best visited in the forenoon as it is much frequented later in the day by visitors to Vernet. From there I went on through the village of Casteil towards Col Jody. In a field close by the bridge over the river Cady, a "hot corner" for Rhopalocera, I took several *Parnassius mnemosyne* in good condition. Presumably they had been blown down by the strong breeze from the higher mountains and when seen on the wing at a little distance I was struck by their resemblance to *Aporia crataegi*.

June 13th was spent in the Hotel grounds in the hope of finding *Laeosopis roboris*. This species is to be found at Vernet in June and July beyond the Grand Hotel du Parc and beyond the Dairy and Tennis Court on a rather high path whence you overlook the leaves on which it settles. But although I took several *T. rumina* var. *medesicaste* there in very good condition and quite a number of *S. orion*, I saw nothing of *L. roboris*, and do not think that it was out. In the afternoon I left for Perpignan, and thence went on to Barcelona, and on June 22nd, after collecting in various parts of Spain, found myself back in S.W. France at Guethéry.

This last place is a charming spot, lying as it does at the head of the Bay of Biscay, with a lovely view of Biarritz a few miles off. But Rhopalocera here were a great disappointment. The best capture was one *Melanargia galathea* var. *procida*, and that on a beautifully fine day.

The next day found me in the Forest of Fontainebleau by 10 a.m., but unfortunately the weather was dull and the results again very disappointing. The best capture was *Nordmannia* (*Thecla*) *ilicis*. The fact that some 14,000 adders are annually killed in the forest is a note of warning as to where one treads. The captures during the nine days spent in France were by no means encouraging, either in number or species.

Diestrammena marmorata, Haan. A Remarkable Exotic Orthopteron in England.

By MALCOLM BURR, D.Sc., F.E.S.

I am indebted to the Rev. E. N. Bloomfield for the opportunity of examining a remarkable addition to our list of introduced Orthoptera. The species in question is *Diestrammena marmorata*, Haan, a native of Japan. Mr. Bloomfield received the specimens from Miss Alice Young, of Rye, who informs me that three specimens were taken by her sister on September 23rd, October 19th, and November 12th, 1912, respectively, in a small outhouse at the end of a paved yard in the garden of a house at St. Leonards.

It is probable that they were bred there, as Mr. Bloomfield suggested to me, since the ova, as Wünn has shown, are deposited in crevices in earth, and so can easily be transported from place to place, though they hatch remarkably soon, at least under favourable conditions, as Wünn's specimens hatched within a day or two of being deposited.

This is not the first record of the occurrence of these creatures in Europe, for Chopard has recently (*Ann. Soc. Ent. France*, 1913, p. 284) recorded their occurrence in some numbers in a greenhouse at Lille, and they have been established in some place in Germany, certainly since 1904. Hermann Wünn describes the circumstances and their habits in detail in an article entitled "Beobachtungen über eine in Mitteleuropa eingeschleppte Höhlenheuschrecke," in the *Zeitschrift für Insekten-biologie*, Band V., pp. 82, 113, and 163, 1909. This author refers to their occurrence in greenhouses in Südmühle, near Münster in Westphalia, at Lommatsch in Saxony, at Frankfurt-am-Main, Erfurt, Fulda, and Wandsbeck; at the last place they appear to have been first noticed as long ago as 1903.

They were at first looked upon as serious enemies to the plants in the hothouses, and doubtless numbers were killed by zealous gardeners, but Wünn's observations confirm the accepted belief that these creatures are carnivorous, and therefore the friend, rather than the foe, of man. Wünn found a colony hiding below flagstones under a hothouse at Fulda. Kept in a suitable terrarium, they refused flowers and leaves, but when apparently hungry ate dates, apple rings, and egg plums, though they refused figs and nuts, but they eagerly devoured chopped-meat and attacked live insects, which their nimbleness enabled them to catch; one specimen actually caught and ate an imago of *Eumorpha elpenor* which emerged from a pupa in the terrarium, and small Lepidoptera were readily devoured.

On June 25th Wünn observed a female carrying a spermatophore, which had been attached by a male to her genital opening; she bent her body and tore it open with her jaws; it took her about 45 minutes to open the outer covering, and in about an hour and a half the whole thing was removed; on July 4th she laid her eggs, and the first larva hatched out on the 6th, and some more a day or two later. The ova are about 1mm. broad by 2mm. long, and the shell, which hardens rapidly after deposition, is sufficiently strong to protect the ovum against severe shocks.

This curious phenomenon in allied genera has recently been described and discussed in detail in Russian by B. Boldyreff in the *Horae Soc. Ent. Ross.*, xl., No. 6, 1913.

Diestrammena belongs to the group *Rhaphidophoræ*, related to our South European *Dolichopodidae*, divisions of the *Stenopelmatidae*. This is a widely-spread and remarkable group of *Locustodea* (*Phasgonurodea*); they are devoid of any traces of organs of flight and of auditory apparatus, and the tarsi are laterally compressed, in contradistinction to all other *Locustodea* on which the tarsi are depressed. Like its European relatives, *Diestrammena* is a remarkably spidery creature, with extremely long and slender legs and appendages; the general colour is invariably some shade of more or less marbled yellow brown.

They live in caves or in holes in wood, etc., and shun the light; the eyes are but little reduced, but the very long antennæ and palpi and cerci, point to a high development of the tactile sense.

D. marmorata is a well-known Japanese species; other members of the genus are *D. unicolor*, Br., recorded from Vladivostok, Pekin, and the Mulmein caverns in Tenasserim. Wünn is uncertain whether to refer his specimens to *D. marmorata* or to *D. unicolor*. Personally, I refer those submitted to me by Miss Young to the former species; moreover, so much garden produce is imported now-a-days from Japan, that that country seems more likely to send us unexpected representatives of its fauna than Vladivostok, Pekin or Tenasserim.

[Since writing the above I have heard further from Mr. Bloomfield that the creature occurs at Relfe's Nursery Grounds, St. Leonards, which is doubtless the original source of Miss Young's specimens. Mr. Bloomfield has since received six more from the Nursery, where it is reported to be not uncommon in the Fern House, where they now and then receive plants from Japan.—M.B.]

The Terminology of Variation.

By Hy. J. TURNER, F.E.S.

On page 217 of volume xxiii. of our Magazine, is a complaint of the "bare, non-informational system of loose nomenclature, which is gradually creeping into our entomological literature," and the complaint of these "slipshod methods of writing," which "ought never to have been allowed to come into our science," is here repeated. The following gems are culled from recent entomological literature. *Papilio podalirius podalirius podalirius*, *Pieris napi napi napi*, *Pieris brassicæ brassicæ brassicæ*, *Euchloë bellezina insularis sardoa præcox*, *Zygæna carniolica appenina calabrica intermedia cingulata*, and so on and so on. To nine hundred and ninety-nine out of a thousand lepidopterists these names are empty strings of words with but little intelligible meaning. Surely one must urge that the indications of the relationship these appellatives imply should always be inserted. Again it is urged as on page 218, vol. xxiii., "Science, to be really science, admits of no slovenly methods; it must be exact, not only in its essentials, but in its use of terms, which are the handles, as it were, of its essentials."

Apropos of the above paragraph, is it possible to arrange a code of terms which will be universally understandable? At an early stage of our study we were quite content with the term "var."=*varietas* (variety) of Linneus. Our necessity then and for many years went no further. This term covered all divergence from the form* commonly recognised as the exponent of a species, until the introduction of the term "ab." for *aberratio* (aberration).

It had become so apparent that under the term "variety" there were designated at least two absolutely distinct classes of facts, that even before the time of Herrich Schäffer's *Sys. Bear. Schm. Eur.*, the term "ab." = aberratio (aberration) had been introduced, for we find him writing in that work, "Abweichungen, die bei Examplaren Ein und derselben Brut vorkommen können und wirklich öfters vorkommen, bezeichnet man als *Varietät*, Spielart. Abweichungen dagegen, welche nur ausnahmsweise und in einzelnen Exemplaren beobachtet werden und durch Form, Zeichnung order Farbenvertheilung ein der Stammart ganz fremdartiges Ansehen haben, nennt man *Aberratio*, Abart." (Vol. i., p. 4, 1843.)

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* I refrain from using the word "type" here, as I am of opinion that Linneus did not in fact stereotype one particular individual specimen as the type, an opinion that is suggested and supported indirectly by the careful perusal of Mr. Roger Verity's paper read before the Linnean Society, May, 1913, entitled "Revision of the Linnean Types of Palæarctic Rhopalocera."

The different significance of these two terms was quite easily understood and remembered. The latter was introduced to designate a more or less isolated and non-recurrent form, uncertain in its cause of origin, and absolutely uncertain in its appearance in season and locality. That left all other variations indicated by the term "var.," which, with the progress of study and the necessity and desire of indicating by names, soon became a conspicuously confused term, as it gave no indication of the different ideas of the relationships comprised under it.

In the year 1861 Dr. Staudinger in his *Cat. Lep. Eur.*, Ed. I., p. x., attempted to define strictly the scientific significance to be henceforth understood by the signs *var.* and *ab.* He says, "I have endeavoured to establish distinctly the differences which separate purely accidental varieties or *aberrations*, from local varieties or *races*. The first (designated by "ab.") are in my usage those which are liable to occur everywhere, in the same area and at the same time as individuals of the species itself or those of its own race."

He then goes on to point out two classes of "aberration," "Some are always reproduced obviously of the same facies, as for example ab. *valesina* of *Argynnis paphia*, ab. *hospita* of *Nemeophila plantaginis*, etc., others, on the contrary are subject to almost infinite variation, without ever recurring exactly of the same form."

"It is quite different with local varieties or races which are as important in the series as species. I have designated these by a "v." (varietas). It is here that it is often very difficult to decide whether these forms are only modifications of the type, or if they should be separated."

It must here be noted that after cutting off the non-recurrent variations at first included, it was necessarily implied that the variations then comprised under the term "var.," were those which recurred more or less regularly under the condition of season or locality.

We thus see that Staudinger to all intents and purposes first fixed the definite application of the term "ab.," and secondly, not only took out this portion of the original signification of the term "var.," but still further restricted the latter to the idea of what we now generally call "subspecies" or "geographical races," thus making all the other ideas formerly implied under the term "var." to become indesignate.*

In spite of this pronouncement of Staudinger in 1861, the term

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* Frühstorfer's use of the term "subspecies" to signify what is nothing more than a casual though recurrent aberration, such as his subspecies of *Lycaena arion*, is simply indefensible.—G. W.

"var." is still used in a general sense to cover all kinds of divergence which do not fall under the well defined term "ab."†

The entrancing study of the variation of species attracted many votaries, to whom the term "var." in the Staudingerian sense was much too comprehensive and indefinite. First, the variations due to the conditions of season were indicated by the new terms "gen. æs."= generatio æstiva, and "gen. vern."=generatio vernalis, for the recurrent summer or spring form as opposed to the typical form. That left two main ideas under the term "var.": (1) the recurrent variation encountered regularly in some portion of the area inhabited by the species; (2) the recurrent and apparently fixed form of a species confined to an area (country, etc.) more or less definitely detached geographically from the general area of distribution of the type form. In the latter case the term "sub-sp."=sub-species, has been used by many, with the idea that here we have a "species in the making," *i.e.*, given sufficient time, complete isolation from opportunities of crossing with the type form, and other altered conditions, a new species would eventually arise. For a variation which is localised in high altitudes and is exclusively recurrent and which can come under none of the foregoing specialised cases of "var." it has been proposed to use "v. alt."= varietas alticola. Thus we are left with the original term "var." shorn of most of its significance and restricted in its application to "any recurrent variation encountered regularly in some portion of the area inhabited by the species" (and sub-species). There are still several other terms which are used more or less indefinitely and indiscriminately to cover the ideas outlined above. For example, "forma"=form and "race." The word "form" seems much too indefinite and much too general in its common use and significance to be used in so restricted an application as to be capable of assuming the definite requirement of exact terminology. The same objection can be raised in the case of the word "race" but perhaps with much less force. It has been used to express the idea of a recurrent and stable variation occurring in the area inhabited by a form recognised as a species or "sub-species," *i.e.*, more or less coincident with the restricted application of the term "var." as above.

In the "Revision of the Sphingidæ," referred to previously, Messrs. Rothschild and Jordan discuss the question at some length. They point out that, "the differences between varieties of the same species are characters which may be termed rudimentary specific barriers and that the varieties themselves are rudimentary (=incipient) species." They clearly lay it down that by the term "sub-species" they "designate nothing else but the geographically separated different components of a species." All other variation is considered by them as "individually or seasonally falling under the category dimorphism or polymorphism," and they discard the term "var." as stated above and substitute the equally unsuitable word "form," adding qualifying syllables to show various relationships, *i.e.*, *f.* norma = normal form, ♀ *f.* = female form, etc. In addition they suggest that it be invariably understood that the third name in order be the subspecific name unless otherwise stated and needs no abbreviated term attached.

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† Rothschild and Jordan in 1903, in their "Revision of the *Sphingidae*," accept this situation and remark, "We understand under *variety* not a particular category of the components of a species, but employ the term for all the different members of a species indiscriminately. The different categories of variation must receive special terms in a precise classification and a special formula must be employed for them in a precise nomenclature." (page xliii.) They therefore drop the precise significance to the word *varietas*.

Applying the above terminology to the name *Zygaena carniolica appennina calabrica intermedia cingulata*, it is possible that the following is a solution, although no one but the author can presume a knowledge of the exact intention. *Anthrocera* (*Zygaena*) *carniolica*, sub. sp. *appenina*, race *calabrica*, var. *intermedia*, ab. *cingulata*. Again *Euchloë bellezina insularis sardoa praecox* should possibly mean *Euchloë tagis*, sub. sp. *insularis*, race *sardoa*, var. or ab. *praecox*. But what *Pieris brassicae brassicae brassicae* or *Papilio podalirius maura podalirius* signifies is beyond anyone but the author to translate.

There will always be the difficulty of fitting every new fact to our scheme of terms on account of the constant occurrence of overlapping, yet if the use of such a code of varietal indication be insisted on, so much the greater will be the ease with which we, as readers and students, can understand the writings of the specialists whose work necessitates the interpretation of the above signs.

SCIENTIFIC NOTES AND OBSERVATIONS.

Dr. Verity's Revision of the Linnean types.—It is a most unfortunate circumstance, though one for which of course the author is in no way to blame, that Dr. Verity's paper on the Palæarctic Rhopalocera in the Linnean collection should come into the hands of so many entomologists without the criticism by Dr. Jordan that accompanies it in the Transactions of the Linnean Society. This criticism robs the paper of much of its sting because it robs it of much of its importance, showing, as it does, that the primary data are really insufficient in most cases to serve as a basis for such violent changes as are suggested, and that in some cases at any rate the conclusions are demonstrably incorrect. I shall hope shortly to be able to treat this paper critically in detail, so will now only express a hope that no systematic entomologists will jump to the conclusion that these changes must all (or even mostly) be accepted without thorough examination, or indeed, without a distinct pronouncement from the International Committee. I cannot, however, refrain from recording at once my complete agreement with one at least of Dr. Verity's conclusions, of the truth of which I have been convinced for years, namely that it is, from any point of view, impossible to retain *idas*, as the name of Rambur's Spanish Lycænid, the full cogency of the reasons for which is hardly brought out by Dr. Verity, possibly because he regarded them as so very obvious.—George Wheeler, 37, Gloucester Place, W.

NOTES ON COLLECTING, Etc.

Colias edusa, etc., near Bognor.—On August 15th, while spending a fortnight at Bognor, I saw two *Colias edusa* one in fine condition, the other much worn, a *Pyrameis cardui*, and *P. atalanta*. There were plenty of traces of *Smerinthus ocellatus* larvæ, but apparently all had gone down. On August 5th, near Goodwood, the larvæ of *Cucullia* *lychnitis* were common, and *Pieris rapae* and *Epinephele tithonus* were abundant. I was at Horsley this morning soon after six to try for larvæ of *Theretra porcellus*, but with no success. I found, however, two full-fed larvæ of *S. ocellatus*.—W. J. Kaye, (F.E.S.), Caracas, Ditton Hill, Surbiton. *August* 22*nd*.

Food of the larvæ of the Coleopteron Cassida viridis.—On August 12th, during one of the fitful gleams of the sun while on a drive from Salzburg to visit the wonderful salt mines of Berchtesgaden and the weird Konigs See I had a sufficient glimpse of *Euvanessa antiopa* to identify it as it dodged to and fro in front of the horses. Instead of following the example of the average visitor and be piloted by one of the native women out into the lake, I took a most lovely wood path which led to the "coign of vantage" called the Malerwinkel. All along the walk grew a large yellow-flowered *Salvia* of which everywhere the leaves were much riddled after the manner of our British Coltsfoot by *Porrittia galactodactyla*. A search soon showed abundance of larvæ and pupæ very similar to those I had years ago found on thistle, and which turned out to be the young stages of a species of *Cassida*. Some of these larvæ and pupæ were put into a tin and brought away. To-day I find that several specimens of the common *Cassida viridis* have emerged. I thought that possibly it might not have been recorded that *Salvia* is one of the food-plants of the *Cassida*. —H. J. Turner. *August* 20*th*.

Cetonia aurata in numbers.—On August 3rd, in the meadows at the back of Cortina, on the slopes of the Sorapis, I saw several large plants of a very beautiful globular headed thistle. On close approach the capitulum of each flower head was found to be attacked by one or more fine specimens of the beautiful *Cetonia aurata*. The specimens, of which I took about a dozen, seemed somewhat larger than the specimens one is familiar with as having been taken in England.—H. J. Turner. *August* 20*th*.

Nests of Hymenoptera.—On August 4th, while on a drive from Cortina d'Ampezzo, in the Dolomites, to Pieve di Cadore, to visit the birthplace of the painter Titian, taking advantage of the driver's halt to refresh his horse (?), at one of the small road-side villages on the southern slopes of the Antelao below the scene of the disastrous landslip of 1816, I found, on the very exposed face of a rough stone wall, the nest of a wasp, possibly that of a *Polistes*. The nest was attached by its pedicel, and must inevitably have been destroyed by the driving storms to which the district is subject at times. None of the cells were occupied. This reminds me that some three or four years ago, while going through the churchyard at Grindelwald, I saw the nest of another species of Hymenoptera on the exposed face of a memorial of rough untrimmed stone. The nest was of mud, and in both colour and texture so exactly resembled the rough stone that it would not have been seen but for the activity of the makers. The nest, too, faced the mid-day sun, and must also have been liable to suffer from drenching rain, but of course, being sessile, would not be so easily swept away as in the former case, where the nest itself was frail and, in addition, attached to the stone only by a slender pedicel.—H. J. Turner.

Butterflies drinking.—On the morning of August 5th, I took a ramble from Cortina to Tre Croci up the Bigontina. During the previous night there had been a storm, and the ground was somewhat moist, although the sun was brilliant and delightfully warm. As midday approached all along the road large quantities of butterflies were seen "drinking" up the moisture in the sun. They were principally of the genus *Erebia*, *E. euryale*, swarms, *E. pronoë*, abundant, *E. tyndarus*, a few, and *E. melampus*, a few. Although *Brenthis pales* was common on the adjacent slopes of the Sorapis, I did not see one cross over on to the road to assist in the feast. The sight was quite apparent to all the passers-by as I was informed of the occurrence by several friends subsequently, and I repeatedly saw visitors stop to look at the living black clouds. I am inclined to put *Euranessa antiopa* down as a drinker. An individual flew around me among the pines and finally settled in the road, it was, however, far too wary and I failed to secure what was a lovely and perfect specimen. Blues were very scarce on this ground, only two or three specimens of *Agriades coridon* and of *Cyaniris semiargus* were seen.—H. J. TURNER.

FOOD OF LARVÆ OF SPILOSOMA LUBRICIPEDA.—In the garden to-day I notice that the young larvæ of the above species are feeding on the thick leaves of bedded out Begonias, leaves of the Geraniums, including the succulent ivy-leaved kinds, the foliage of the Tradescantia and also on the Michaelmas Daisy.—HY. J. TURNER. *August 24th.*

DEIOPEIA PULCHELLA IN DERBYSHIRE.—May I bring to your notice, the capture of a female *Deiopeia pulchella*. The moth was taken on June 14th by a member of the Trent College, N.H.S., and was beaten out of laurel bushes in the college grounds. It is not a good specimen, probably owing to the buffetings received on its long journey. I believe there are very few, if any, records of the capture of *Deiopeia pulchella* in a locality so far from the sea and the continent, as Trent, and, so far as I know, it is some years since it was taken at all in England.—H. H. WALLIS, Trent College, Derbyshire. *July 24th.*

[It is very annoying to find after this is in print that the identical paragraph has been sent to another magazine.—H.J.T.]

SEASON OF 1912 IN THE ABERTILLERY DISTRICT.—May I suggest that it is a mistake to include under such a heading notes for Folkestone and other places, far far from Wales. Surely the notes for Folkestone should be published separately; or else the title of the paper might be made less special. My reason for uttering this grumble is that any Kentish entomologist might very easily pass over a paper on Monmouthshire in glancing through back numbers. If he did so, would he be to blame?—P. A. BUXTON (F.E.S.), Tonbridge.

[Localities are indexed year by year, and this digression to Folkestone should appear among them.—H.J.T.]

EUCHLOË CARDAMINES.—I do not wish to comment on the main point of Mrs. Page's note (p. 201.) May I, however, record the fact that in 1912 the insect in question was extremely abundant at Cambridge, whereas this season (1913) has found it quite remarkably scarce. In the neighbourhood of Cambridge this is certainly not due to over collecting. I am inclined to wonder whether the same may not be the case even at Horsley.—P. A. BUXTON (F.E.S.), Tonbridge.

CURRENT NOTES AND SHORT NOTICES.

Enquirers as to the authorship of Current Notes please note:—"Current Notes are, as a rule, contributed by the Acting Editor who is responsible for them. Those contributed by the other Editors or by correspondents have initials attached."—*Ent. Record*, Vol. xxiv., p. 128 (1912).

We regret to announce the death, on November 29th, 1912, of Miss E. E. Mazaraky, corresponding Member of the Russian Entomological Society, at the very early age of 26. Miss Mazaraky did not contribute to the literature of Entomology, but her loss is deeply felt in St. Petersburg, where she regularly enlivened meetings by her genial presence, and greatly helped her uncle, V. V. Mazaraky, the hard-working treasurer.—M.B.

The same Society more recently suffered another loss in the person of Count Michael Nikolaievitch Rostovtseff, in his forty-fourth year. Count Restovtseff was not much known in Entomological circles outside St. Petersburg, but many personal friends will deplore the absence of this charming and gifted man. In 1908 he made large collections of insects in Southern Italy and Northern Africa, which he handed over to his friend A. P. Semenoff-Tian-Shansky.—M.B.

Mr. A. E. J. Carter, in the *Ent. Mo. Mag.* for August, introduces two species of *Limnobiidae* (Diptera) new to Britain. *Dicranomyia rufiventris* taken in Perthshire has been recorded from Finland hitherto. *Acyphona areolata* was taken at Musselburgh, Midlothian, in July, 1906, and is another species hitherto only recorded from Finland.

Mr. R. S. Bagnall has contributed an article on the remarkable new order of insects, the *Protura* of Silvestri, to *Knowledge*, vol. ix., p. 215 (1912). The study of these minute, most primitive insects, besides being of extreme interest, will probably turn out to be of considerable economic importance to agriculturalists and horticulturalists.

Mr. D. Sharp, in the July number of the *Ent. Mo. Mag.*, adds a new Coleopteron *Cryptobium brevipenne* to the British fauna. Hitherto this species has been confused with *C. fracticorne*, which is the rarer insect and was only recently discovered by Mr. Ford at Bournemouth, and afterwards rightly determined. He also announces four species of *Homalota*, new to science, which had long previously been confounded under the name *H. fungicola*. He has named them *H. reperta*, from Brockenhurst, in a hollow beech; *H. inoptata*, with the former species; *H. gynandrica*, only one specimen, with the two last species; and *H. subquadrata* from the same locality.

Several other new species of Coleoptera are announced in the July number of the *Ent. Mo. Mag.* Mr. Newbery describes a species of *Apion*, found by Dr. C. F. Selous by sweeping mixed herbage at Barton-on-Sea, as new to science under the name *Apion selousi*. It is near to *A. cerdo*. Mr. Joy describes three species of Staphylinids as new to science; (1) *Atheta britteni*, from flood rubbish, Langwathly, Cumberland; (2) *Trogophloeus hemerinus*, from burrows in the mudbanks at Anthorn-on-Solway, Cumberland, in company with *Bledius atricapillus*, obtained by Mr. Day; and (3) *Thinobius longicornis*, from flood-rubbish at Dalwhinnie, Inverness-shire.

An example of a *Scoparia*, "in good condition, without label," "taken some years ago in the neighbourhood of Chester," "probably at the electric light," is the basis for the introduction of a species both new to Britain and new to science by Mr. E. Meyrick in the *Ent. Mo. Mag.* for July. It is "probably most allied to *S. alpina*," "from superficial appearance . . . . a frequenter of open ground (not tree trunks)," and "should be looked for on sand-hills and hillsides." It is suggested that it may be of foreign origin, but no European or exotic species approaching it is known. The specimen is to be called *Scoparia vafra*, Meyr. Before coming to a decision as to the specific stability of this specimen, which is characterised by so much "probability," it is necessary to examine it from the point of view of more advanced modern work. In the *Trans. Ent. Soc. Lond.*, 1911, p. 501, Dr. Chapman has a paper entitled "On the British (and a few Continental) species of *Scoparia*, Hw.," illustrated by 9 plates containing some 75 figures of the genitalia. The results there arrived at on definite structural characters are substantially the same as those previously suggested by both M. Guenée and Mr. E. R. Bankes and based on considerations of habits and markings.

The last published part of the *Memoires de la Société Entomologique de Belge* contains the 22nd instalment of a Revision of the *Prionides*, which was commenced in the *Annales*, in 1902, by Prof. Aug. Lameere of the University of Brussels. There are included in the present contribution a summary of the corrections suggested by the new material which has come to hand during the progress of the work, and also descriptions of the new species which have come into the hands of the author.

In a recently published paper in the *Proceedings of the U.S. National Museum*, Prof. Harrison G. Dyar gives an account of some 242 species of Lepidoptera obtained in the Yale Peruvian Expedition of 1911, and therein states that "a large part of the species of Lepidoptera could not be found in the collection of the U.S. National Museum at Washington." It was necessary for him to send the specimens to London for comparison and identification. This is undeniable evidence of the richness and condition of our National and other collections and a strong testimony as to the knowledge and ability of our scientific workers.

The July part of the *Annales de la Société Entomologique de Belgique* contains a note on the Circulation of the Blood in the Wings of Insects, by M. R. Bervoets. A resumé of the results of previous writers is given with a quotation from the conclusions of Messrs. J. H. Comstock and J. G. Needham, that "the adult wing, whatever it may have been originally, has become a dry resilient plate of chitine traversed by finely adjusted supports." M. Bervoets gives an account of his own experiments and observations with the wings of living insects, the may-bug, the house-fly, a Pierid, a dragon-fly, etc., in considerable detail, and concludes his investigation with the opinion "qu'il exist une circulation du sang dans toutes les ailes des insectes et que ces organes du vol ne sont donc desséchés en aucun cas; que cette circulation est destinée à aller nourrir les éléments nerveux et sensoriels qui s'y rencontrent et que par conséquent l'aile n'est pas un organe mort et desséché, mais bien un organe vivant et sensible."

In the same part M. Francis J. Ball contributes some notes on the Lepidoptera of Belgium, including a short summary of the species of the genus *Hesperia* in Belgium. That no less than eight species of this genus should occur in a continental area so closely adjoining our own country, which has only one, is a most remarkable fact. That there can be little doubt as to the reliability of this list we are assured, since all the specimens upon which it is based have been submitted to M. Reverdin of Geneva for verification. Dates and localities appear to be also reliable. The list is as follows:—*Hesperia sao*, *H. carthami*, *H. serratulae*, *H. alveus* (four undoubted specimens), *H. alveus* var. *foulquieri* (two undoubted specimens), *H. armoricanus*, *H. cirsii* (one undoubted specimen), *H. onopordi* (one undoubted specimen), *H. malvae*, and *H. malvae* var. *taras*. The writer also records a specimen of *H. malvae* ♂, typical on the left side and var. *taras* on the right side, taken at Hockai, Belgium, June 22nd, 1912.

Parts IV. and V. of the *Annales de la Société Entomologique de Belgique*, 1913, contain a number of papers on Coleoptera, mainly exotic, one each on Hemiptera and Ants, and by Baron de Crombrugghe de Picquendaele, a series of notes on the Micro-lepidoptera of Belgium, supplementary to his *Catalogue raisonné*.

In the *Athenaeum* for May 17th, in a Review on "The Supplement to the Coleoptera of the British Isles," by Canon Fowler and H. St. J. K. Donisthorpe, we note the following appreciative remarks on our esteemed colleague:—"Mr. Donisthorpe's notes are beyond praise, and all too few, proving him to be, if proof were necessary, a shrewd and careful observer. We note specially his essay on the Myrmecophilous Coleoptera of Great Britain, which gives the life-histories and habits of several of the species belonging to this most interesting group."

From 1871 to 1882 there appeared in the old *Scottish Naturalist*, as part of Dr. F. Buchanan White's *Insecta Scotica* a series of notes by Mr. D. Sharp on the "Coleoptera of Scotland." In the July number of the present *Scottish Naturalist* Mr. Anderson Ferguson has commenced a supplement to those articles based largely on the recently published vol. vi. of the *Coleoptera of the British Islands*, by Canon Fowler and Mr. H. St. J. K. Donisthorpe, but containing many local records and notes, to which those authors did not at the time have access.

Mr. Willoughby Gardner informs us that the "types" of micro-lepidoptera in the collection of the late Thomas Boyd have been placed in the National Collection at South Kensington Museum, by Mrs. W. C. Boyd, of Waltham Cross.

M. A. Janet notes, *Bull. Soc. Ent. Fr.*, p. 290, 1913, that the first figure on plate 94, vol. ix., of Seitz's *Macrolepidoptera Fauna Ind. Australica*, *Diurna*, represents under the name *Anadebis batmara* a Satyrid coming from Tonkin treated in the text as a local form of *A. diademoides*, Moore, described by Frühstorfer in Iris. Vol. xx., p. 253 (1907). This form is none other than that described by him (M. Janet) in the *Bull. Soc. Ent. Fr.*, p. 216, 1896, under the name *Zethera noirei*. The type and co-type of this last with the plate from Seitz for comparison were exhibited at the meeting of the Society on June 25th.

In the *Rev. Mens. Soc. Ent. Namur.*, of July, a new form of *Parascotia* (*Boletobia*) *fuliginaria* is announced by M. J. Guerin. This aberration, which the author names ab. *brabantaria*, after the late M. Brabant a distinguished entomologist of N. France, is characterized by the under surface of all the wings being of a uniformly white colour with the markings standing out in relief as if put on lightly with a crayon.

We read in the *Entomological News* for July that the system now used in the U.S. National Museum for arranging the insect collection consists of cork-lined trays of various sizes for each species, so that when re-arrangement takes place an entire species can be handled at one time, instead of only one specimen as heretofore. This, of course, could not be done if the drawers were glass-bottomed, as in all the newer cabinets in our British Museum. Even in these latter cabinets it is quite possible, with care, to remove rows at a time, if a stand or empty drawer be at hand to temporarily hold the removed rows. Some years ago we remember seeing a home-made cabinet (not glass-bottomed) in which the cork was fixed to moveable slips pinned down to the bottom of the drawer.

To those entomologists interested in the Lepidopterous Fauna of Bosnia and Herzegovina we would call attention to the series of articles contributed by Dr. Karl Schawerda to the *Verh. k.k. zoo.-bot. Gesel. Wien*, of which the last appears on page 141 *et seq*. of the present year's issue, as a result of a three weeks' visit paid by himself and his friends—Dr. Karl Schima and Baurates Hans Kautz—to the mountainous area bordering on the Montenegrin territory. Dr. Schawerda has also included the results of the work of Herr Josef Janecko, who collected for him over the same ground in the spring and autumn. The articles previously written will be found in the *Verh.*, 1906, pp. 650-652; 1908, pp. (250-256); 1908, *Jahres. Wn. Ent. Ver.*, pp. 85-126; 1910, *Verh.*, pp. (19-34) and pp. (90-93); 1911. pp. (80-90) and p. (175); 1912, pp. (112-116), p. 122, pp. (138-148).

REVIEWS AND NOTICES OF BOOKS.

Proceedings of the South London Entomological and Natural History Society.—1912. 154+xx. pp. 10 Plates. 4s. 6d. Published by the Society at their Rooms, Hibernia Chambers, London Bridge.—This volume of 174 pages with ten black and white plates is half as big again as the "Proceedings" for the previous year, when there were only four plates. That such a Society can afford to produce so pretentious a volume shows strong enthusiasm coupled with strict economy, for according to the balance sheet the income is only just over sixty pounds per annum. Of the papers published two are by Mr. R. Adkin—"Varietal Names as applied to the British Lepidoptera" and "Labelling Entomological Specimens." With the former we are largely at one with the author. The difficult point is what forms ought to be named and what not. All proved geographical forms certainly should be named and all strongly marked aberrations, we hold, should be named if recurrent. From the utility point of view it is doubtful if any good purpose is served by naming a unique aberration, unless it comes under one of Mr. Adkin's general names such as *obscura*, or *rufa*, etc. With Mr. Adkin's second short paper on "Labelling Entomological Specimens," we are in agreement entirely when he asks for each individual specimen to be labelled with exact data. But in asking all and sundry to fill in the counties and vice-counties of the Watsonian map we see trouble. Errors would be as plentiful as blackberries. We should much prefer to leave the matter to a careful collector and compiler of the individual records. Mr. A.

E. Gibbs has a very useful paper on "The genus *Coenonympha*," where, besides tabulating the chief variations to which the several species are prone, he discusses at some length the specific identity, or otherwise, of some of the more obscure forms. Mr. W. J. Lucas contributes notes on "Earwigs that breed in Britain," and treats seriatim the species of our native *Forficulidae*. It will be noted that under the recently considered rare *Forficula lesnei* there are now localities in every county from Berkshire to the Scilly Isles. Following this paper comes one on "Mimicry in Coleoptera" by Mr. C. J. Gahan. To hear what such a well-known authority on the Coleoptera has to say with regard to Mimicry in that order is interesting reading, and we need only say here that Mr. Gahan is a stout "defender of the faith" in mimicry as a real force in Nature. The Presidential Address by Mr. A. E. Tonge is occupied with a detailed review of the work done by himself with the ova of the British Lepidoptera, and we can say without fear of contradiction that no similar Presidential Address was ever before delivered on the primary stage of the Lepidoptera. The "Abstract of Proceedings," which includes the reports of the field meetings, occupies no less than 79 pages, and covers a very great miscellany of Natural History (but principally entomological) matters. The report of what was exhibited at the Annual Exhibition of Varieties on November 28th runs to a number of pages and shows again what an interesting exhibition this must have been. Mention must also be made of the reports of the Annual Congress of the South-Eastern Union of Scientific Societies, of the British Association and of the Second International Congress of Entomology, to all of which the Society sent delegates. Lastly, as usual, there is a most comprehensive index, so that valuable matter need never be lost sight of. There is one matter, doubtless owing to the Society's laudable attempts at economy, that one cannot help regretting and that is the change of printer. The printing is different to what it used to be; it is clean and clear, but the paper is poor and not good enough, and the cover is a wretched introduction to the interesting matter inside.—W.J.K.

[The paper, both of the book and cover, was selected by the Society's Publication Committee from a number of samples submitted to them.—H.J.T.]

"Guide to Photo-micrography."—We have received from Messrs. E. Leitz, the well-known opticians, a work entitled "Guide to Photomicrography." It gives highly detailed practical instructions for this branch of science, but is designed more especially for users of Leitz's lenses and apparatus. A chapter is devoted to the description of special apparatus for the photography of insects, from which the reader may extract some useful information; we think, however, that practical experience with less elaborate apparatus, would solve many of the implied difficulties. There are also described (with illustrations) apparatus for other branches of this work, such as the photography of large sections, solid objects, stereoscopic photography and cinematography, the last in conjunction with Leitz's new condenser for the photography of living objects, bacteria, etc. The purely photographic procedure is comprehensively treated, and there is a portion devoted to the autochrome process. There are also tables of magnifying powers which will be of service to users of Leitz's objectives and eyepieces.—F.N.C.

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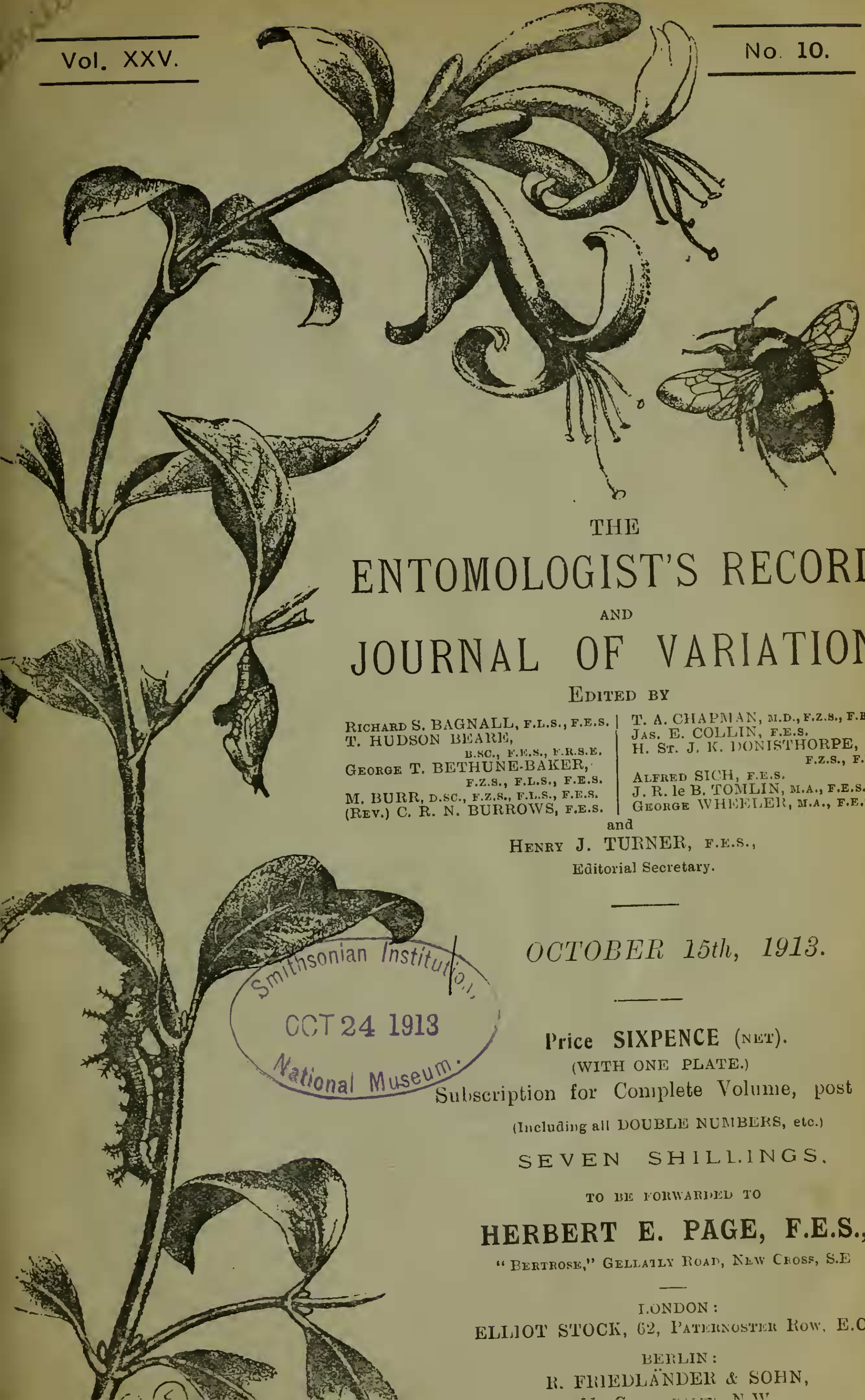

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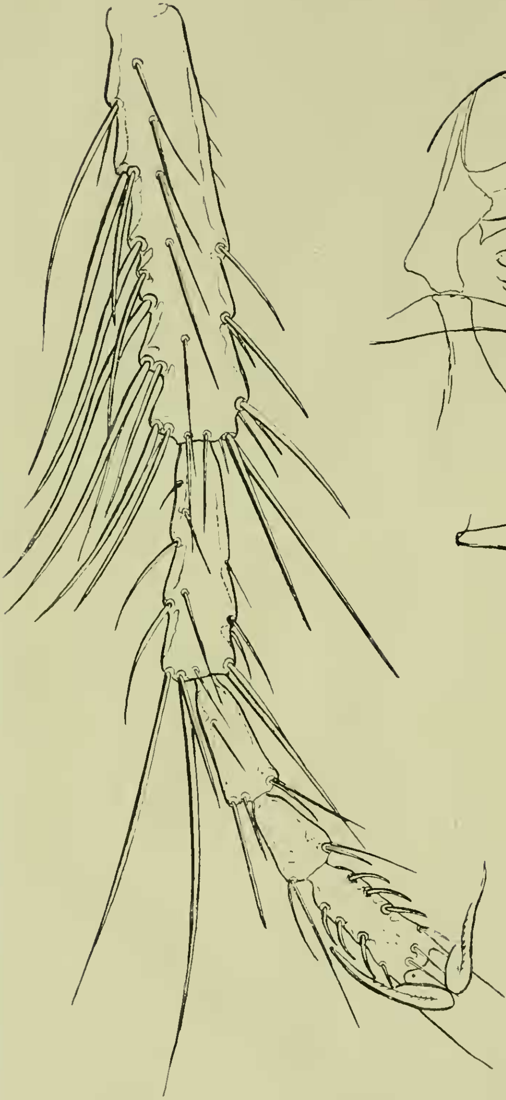

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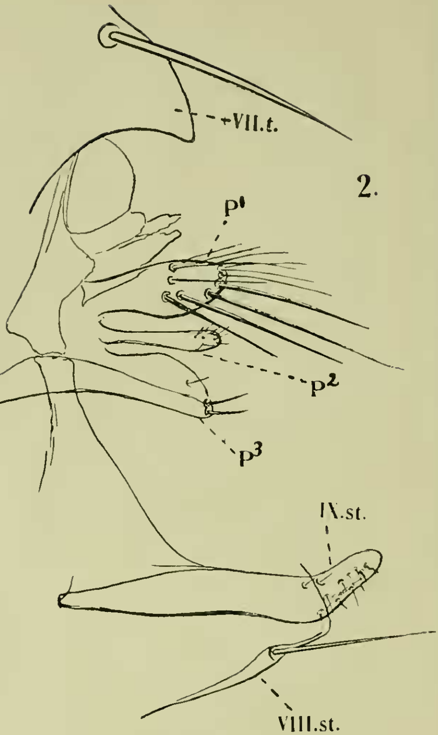

Del. K. Jordan.

Xenopsylla hirtipes sp. nov.

A new Palæarctic species of Xenopsylla (*with plate*).

By the Hon. N. CHARLES ROTHSCHILD, M.A.

Among some *Siphonaptera* lately received from Asiatic Russia there are two ♂ ♂ of a species of *Xenopsylla* which are remarkable for the development of the posterior abdominal segments and the bristles of the legs, particularly on the hind tarsus.

Xenopsylla hirtipes, spec. nov. (Pl. xx., figs. 1-2.) ♂. The species is nearest to *X. gerbilli*, Wagn. (1903). The episternum of the metathorax is separated from the sternum, and the hind femur has no subbasal ventral tooth, in which characteristics *X. hirtipes* agrees with *X. gerbilli*, *X. mycerini*, *X. ramesis* and some other *Xenopsylla* [*cf. Parasitology*, i., p. 58 (1908)]. In both *X. gerbilli* and *X. hirtipes*, the bristles placed at the apices of the tibia and first and second tarsal segments of the hind leg are very long, but, in addition, in *X. hirtipes* the bristles situated at the posterior edge of the first hind tarsal segment are also very long and strong, as shown in fig. 1, this not being the case in any other known species of *Xenopsylla*. Further, the apical margin of the seventh abdominal tergite is dorsally strongly produced in *X. hirtipes* (fig. 2, vii. t.), and the eighth sternite (viii. st.) bears only one ventral bristle on each side in *X. hirtipes*, while it has three in *X. gerbilli*. The clasping organs agree more closely with those of *X. gerbilli* than with those of any other species, but are nevertheless easily distinguished by the upper lobe p^1, being broader and bearing a large number of bristles. Two ♂ ♂ from near Djarkent, Semitchenskoi, E. Turkistan, October 5th, 1912, off *Allactaga elater*, and November 25th, 1912, off *Meriones tamaricinus*.

A Swiss Eldorado.

By P. A. H. MUSCHAMP, B.A., F.E.S.

It may seem injudicious to advertise Eldorado when one has found it, and no doubt it would be so were it not that nature has kindly taken matters into her own hands and put about fifty per cent. of this happy hunting ground well out of the reach of any but the rash fool, who is willing to risk his life in order to bring home with him a huge bunch of edelweiss, rather than rest content with a modest nosegay of these enticing flowers. Let who will come, many terraces will ever remain where the winged beauties may mate unmolested by the man with the net, and where their progeny may ever feed unobserved of all save the satanic black salamander and the predacious Hymenoptera. Here indeed is a "campus et apricis statio gratissima *papilionibus*." Since 1901 I have spent every summer holiday wandering about over hill and dale in every canton of Switzerland and have never found its equal. In order to get to this Eldorado you need but to beg the beneficent distributor of holiday joys to accord you sundry slips of paper giving you the right to travel by the way of Zürich to the quaint little town of Glarus, put your traps and yourself into a carriage belonging to the little hotel at Klönthal and have yourself conveyed thither, unless you prefer to economise, in which case you make use of *shanks his mare* and send up your traps by themselves. This little hotel is situated on a lakelet that is now double the size it was five years ago, owing to a big dam that heaps up its waters before converting them into light for many villages, and force for far distant tramways. The good people, who look after one's comforts there, are all unspoiled by the horrible flood of tourists by whose agency Cook and his rivals raise the prices and lower the charm of so many beautiful spots in Switzerland. Here you are treated as a man and a brother, and fed and lodged decently at a reasonable price. What if the pauses between the dishes be slow; yours the fault if you cannot fill them in with cheerful small-talk. From Klönthal Hotel to the happy hunting ground runs a pathway, which is a continual joy to the eye, and where so many butterflies and moths do congregate, that unless you get up at 4 a.m., and thus avoid temptation by the way side, the probability is that you will never even reach your goal. Leaving the hotel you take a path, at the nearer extremity of which you will see a sign-post directing you to the Klubhütte. This path takes you first through a copse, where, in late June and early July, fine specimens of *Brenthis thore* are to be netted. Then you cross a little bridge and begin to clamber up a steep path through woods leading up to the Rossmatterthal, and in these woods *Abraxas sylvata* generally swarms throughout the whole month of July. The path now follows the side of the torrent that comes down from the glaciers of the Glärnisch, and much collecting may be done the whole way, the predominant butterfly being *Erebia*, well represented by *oeme*, *stygne* var. *pyrenaica*, *ligea*, *pronoë* var. *pitho*, *mnestra*, *pharte*, *ceto*, *melampus*, *medusa* var. *hippomedusa* and *tyndarus*. Well up this beautiful valley lies a tiny group of chalets, or more correctly speaking huts, in the biggest of which you will find very simple food and liquids (non-alcoholic). Now the path becomes steeper, and we reach the rapid slopes that lead up to the Klubhütte, the slopes which we have set out to find! At the very foot of these live the Parnassiids in all their glory and in full numbers. Here indeed, were they so inclined, could *P. apollo* interbreed with *P. delius*, or with *P. mnemosyne*, for I have taken all three of them on the same spot and on the same day. However, *P. delius* and *P. mnemosyne* confine themselves to a little tract of land by the water's side, while *P. apollo* is to be found right up to the top of the slopes, not far from the glacier itself. The blues are remarkably interesting the whole way up, but still more remarkable is it that one finds the predominant blue varying according to the altitude all over the slopes. I took most careful note of this in 1908, and found that from 4,300ft. to 4,600ft I took *Polyommatus eros*, O. (*tithonus*, Hb.), with the alpine forms of *Cupido minimus* and *Cyaniris semiargus*. At an elevation of 4,600ft. *P. eros* ceased abruptly, and was replaced by *Albulina pheretes*, which continued to be the predominant form up to an elevation of 5,900ft. *A. pheretes* is joined by an occasional *Latiorina orbitulus* at about 5,700ft., and this latter remains the only representative of the blues on the slopes up beyond the Klubhütte (Alpine Club Hut). I took it as high as the flower-covered slopes, at an elevation of 7,100ft.

Before going any further let me say a few words about this high flying blue, by far the most interesting of the blues to be found here. It is I believe the form that has been named by Lowe, ab. *aquilonia*, taken by him on the Pilatus, and previously described (but not named) by Frey as having been taken in the Engadine. In 1908 it was abundant on the high slopes of the Glärnisch, but it was only when I reached home that I noticed that I had taken a form new to me; I must say, to excuse my blindness, that I have never taken a very long series of the type. This summer, thanks to the perpetual rains all over the country, blues have been extremely scarce, and this particular insect has suffered so greatly, that though Mr. and Mrs. Page and myself searched for it most conscientiously, I only took a single specimen, a female. I have thus but a tiny series of 31 ab. *aquilonia* in all, but they make up for their want of numbers by being most beautiful and of a very special form. The upperside of the forewings in both sexes has generally from two to six more or less clearly marked white spots, forming an antemarginal band, and the triangular apical spots are very black and bordered with white. The undersides of all four wings are, as compared with those of *L. orbitulus*, extremely pale, paler than in *A. pheretes*; the black pupils in the white patches of the upper sides are much reduced in size and are frequently missing. In the lower wings the pale fawn ground colour reaches only about half way across the wing, being bordered broadly with snowy white; the black spots on the hindwings are either wanting altogether or are represented by one, two or (in a single case) three tiny black dots on the upper margin near the costa; the peacock feathering is often present, and stands out in strong contrast in the middle of the snowy border, and is pushed further back from the fringe than in *L. orbitulus*. This butterfly is rather smaller than *L. orbitulus*, and the cut of the forewing is less rounded. Several of the females have the slaty-blue of the male reaching to the marginal border of the wing. Lowe's ab. *aquilonia* (if, as I presume, this is Lowe's insect), is certainly a local race on the Glärnisch, for I have not seen a single insect approaching the type. Is it something more than a variety? That is what time alone can decide; I intend to sacrifice a few species to the microscope this winter and will, if no kind reader take the job off my hands, do my best to secure the egg and raise the larva, though, as that of *L. orbitulus* is only known up to date as a full-grown refugee under the stones, comparison will be impossible till there be something to compare it with.

Among the *A. pheretes* taken by me on these slopes are a few that I have described in the "Bulletin de la Soc. Lep. Genève" as ab. *pupillata*; these have dark spots in all the white patches of the underwing except in the discoidal; others (underfed?) having a forewing of from 10mm. to 11mm. I have named ab. *minor*. Not uncommon among the females is Wheeler's ab. *caeruleo-punctata*.

On these same slopes *Melitaea cynthia* is usually common enough, and a small percentage of the female *Erebia glacialis* are ab. *alecto*, having the two eyespots visible on the upper and under sides. Vorbrodt, in his work just published, says that ab. *alecto* is rare in Switzerland, and has only been taken in Valais, Engadine and Tessin. Of *E. gorge*, all three forms are found on the Glärnisch, typical *E. gorge*, ab. *erynnis*, and ab. *triopes*.

It would be ridiculous to try to make out a list of all the lepidopterous insects I have taken on and around these glorious slopes; it would be very easy to make a list of those Swiss butterflies that I have *not* found here. All those that are met with in the mountainous districts with exception made for a few strictly local forms like *Erebia christi* and *E. flavofasciata*, *Plebeius sephyrus* var. *lycidas*, and two more generally found species, *Vacciniina optilete* and *Anthocharis simplonia* I have netted up till now on the Glärnisch; still I may perhaps have overlooked them. After having taken sub-sp. *jucunda* (*generensis*), the Geneva local form of *Anthrocera* (*Zygaena*) *fausta*, in large numbers, at an altitude of 6,000ft., in 1908, curiously enough I captured this summer, at 3,200ft., a single specimen evidently just emerged from the pupa, though nearly a month later in the season than those taken so much higher up five years ago. Now *A.* (*Zygaena*) *fausta* is a southerner only represented in Switzerland by a fine large form at Tramelan, and by our quaint little friend sub-sp. *jucunda*, so long supposed to have only one home, the foot of the Salève, which, by the way, is not in Geneva but in France. In 1901 I had the pleasure of finding a few sub-sp. *jucunda* on the Vanil Noir, in the Gruyères. In 1903 my friend Dr. Denso took it on the Jura, not far from Geneva (but in France), and since then it has been recaptured by Dr. Pictet, at the foot of the Diablerets, the place where the first var. *jucunda* had been taken by Meissner in 1818 (after this date it was lost sight of and then renamed var. *genevensis* by Millière, who, in 1861, had obtained it from the Salève). In 1904 Messrs. Tutt, Blachier and myself took it on the same ground on which Denso had found it the summer before. Now the nearest place where this Burnet has been taken is just 100 miles from the Glärnisch, separated as we are from the Diablerets by the whole of the Rhone valley, the Bernese Oberland and the Tödi group. Why should var. *jucunda* exist here, so far north of any other locality in which it has been observed, and about 4,500ft. higher up? If we examine a few score of var. *jucunda* and *A. fausta* side by side, we are struck by the feeling that *A. fausta* is a highly specialised form of var. *jucunda* rather than var. *jucunda* an underfed northern form of *A. fausta*. *Jucunda* is a smaller form; in my series I find that the smallest measures from tip to tip only 15½mm., but the biggest of the tribe is 23mm. across, and that is nearly as big as the giant among my smaller series of *A. fausta*. The colouring is of a sober vermilion on very dark ground, the spots on the upperwings being generally smaller than in *A. fausta*, whose vermilion has been well mixed with orange. In both species the yellow bordering of the red spots is sometimes wanting, but in *A. fausta* the red seems to have invaded the yellow, while in var. *jucunda* it is the black. The red collar (which is yellow in *A. hilaris* and does not appear in *A. algira*) is but a little narrower in the northerner, but the abdominal band that covers three segments in the southerner is incipient or wanting in our Burnet; this is specially the case with the Glärnisch moth; out of 26 netted on the 4th of August, 1908, not one has a sign of the red band, and only one has a portion of the genital armature reddish; on the Salève an incipient band is found in something like 95 per cent. of the insects I have examined.

Variation in the arragement of the markings is more noteworthy in var. *jucunda*, 3, 4, 5, 6 being often enough completely isolated (ab. *segregata*) or may be all confluent, or 5 and 6 may unite in a perfect circle. Judging from my own insects xanthic forms (ab. *lutescens*) are not so very rare, but the lower wing alone is yellow; the wing that is protected from the sun. I suspect all my specimens with pale upperwings of having been subjected to too much sun and rain. My theory is that our small, robust, rapidly moving, varying moth is phylogenetically older than its more gaily coloured southern sister. So far as I can learn *A. fausta* is monophagous, while var. *jucunda* would seem to be a less dainty feeder; I have actually watched a female deposit an egg on *Geum montanum!* This on the Glärnisch.

Leaving this fascinating moth I should add that those who take Burnets will find much to interest them in the valley. *Purpuralis*, *scabiosae*, *achilleae*, *exulans*, *trifolii*, *lonicerae*, *filipendulae*, *transalpina*, *astragali*, *peucedani*, and *ochsenheimeri* are all represented here on different parts of the slopes. One of the best moths I have found there is *Plusia aemula*, which seems to be almost plentiful; this moth is very rarely taken in Switzerland.

As I do not intend to make out a long list of all that is to be taken in my Eldorado, I cannot do better than terminate this short article by advising you to put in at least one night at the Klubhütte, where you will sleep, and sleep grandly, on a bed of hay covered by an Alpine Club blanket; your bed will cost you 10d., and the view from your bed-room window alone should be well worth £10 to any lover of nature. A long stay at the Klubhütte presents certain inconveniences to one who cannot get along without his morning tub, but even this difficulty may be got over if you are not overburthened with shyness.

[Mrs. Page has promised to continue these notes for me, speaking of Glärnisch as she found it in this, the very worst year in the memory of the long-lived Glarus peasants.—P.A.H.M.]

Protective Resemblance.

By C. W. COLTHRUP.

(*Continued from page 182.*)

With regard to Mr. Curtis's remark that "in this country our butterflies are up later and to bed earlier than our birds," this would leave about six hours in which the birds could feed on them while flying, yet, as far as I know, we have no case of "mimicry" among butterflies in this country. On the other hand, if we consider the Rev. K. St. Aubyn Rogers' observation, cited by Mr. Curtis, "*that tropical butterflies rest at a time when tropical birds are most active in pursuit of food*," "mimicry" would appear not to be necessary at all.

On page 97 Mr. Curtis says, "My own experience confirms the recorded observations of many other observers, *the moving insect is attacked where the still one often escapes*." Here again he confirms what I have said, as it is quite obvious that the weeding out process, necessary to bring about "protective resemblance," cannot take place with moving insects. *It is movement that is fatal.* The roebuck and other so-called cryptically coloured animals in the wild state know this and stand or lie perfectly still. It must not be forgotten, however, that their enemies would see them before or at the same time. Another point is that their enemies rely mainly on scent, and more often than not are on the warpath at night, as anyone who has spent nights out in the woods, etc., as I have, can testify by the heartrending squeals one hears. I note, however, that Mr. Curtis was not deceived by the "freezing" roebuck, which "looked like a weather beaten oak stump," and I imagine its natural enemies would not have been either. I should regard the above as an instance in which, to use Mr. Curtis's own words, "*variegation of colours tends to inconspicuousness quite apart from whether the colour and surroundings match or not.*" An exceptionally dark or even a black hare, would be quite inconspicuous crouching on one of the large Sussex beaches, by its resemblance to some of the dark weather-beaten logs lying about there.

I have often noticed in the spring, in Sussex, as many as twenty to thirty hares in the young green corn, where they are most conspicuous. Of course they ought not to be there seeing that their colours do not harmonize, and the important time for the species, the breeding season at hand. Show yourself and they immediately crouch, but their colours do not match. If they were on dry grass land, it would be cited as a splendid case of "protective resemblance." There is a way out, however, look again, can you not see they look like clods of earth. How wonderful! What a wise provision of nature!

On page 97 Mr. Curtis asks why "the bird should trouble to perform the complicated evolution necessary to enable it to catch the insect—unless it recognises it as a palatable meal," and then in the next paragraph on page 98, he says, "the sparrows in our garden get more food than they can eat, yet will go through the most astounding manœuvres to catch *Pieris rapae*, etc." In the first place it does not show that the bird recognised a palatable meal, in the sense that it could discriminate between palatable and unpalatable. If it could, surely the birds in tropical countries could do the same. I have watched our well-fed sparrows catch *Pieris rapae* for sheer "devilment," toy with them and then leave them on the ground, in the same way that they nip off rose leaf-buds and shoots of chrysanthemums that have been stood out temporarily from the conservatory. I should be very sorry to attribute the rejecting of *P. rapae* to distastefulness, neither should I call it a fair test. Yet the conditions are very similar to tests that are often carried on with birds in confinement. On page 98 Mr. Curtis records that the great tit (*Parus major*) brought nearly all green larvæ to its nest, and asks "*if the brown larvæ were not better protected why were not more brought?*" and supplies the answer in an exactly opposite case on page 127, where he instances the case of a chiff-chaff (*P. rufus*) which "*seemed to have a great partiality for the brown Hybernia larvæ.*" He says, "to my eye the green larva on the green leaf is much easier detected than the brown larva on the brown twig." That may be so to his eye, but from his own evidence above I should say that it mattered little to the bird, and also that the bird's eyes were much keener than his and not the reverse as he suggests. What about the brown larva on the green leaf, as instanced by the larvæ of *B. hirtaria?* These larvæ, from the time they are hatched till they are full grown, are of varying shades of brown, with whitish spots in their earlier stages, and during nearly the whole of their existence rest on the undersides of the green leaves of the lime, or on the green leaf twigs, and it is only just previous to pupation that some rest on the dark tree-trunk, the majority let themselves down to earth by a thread. They are not distasteful, as the sparrows in my back garden cleared off nearly all the larvæ in their early stages from four lime trees, yet in the front garden, on three lime trees, the larvæ escaped, not through "protective resemblance" nor "distastefulness," but just "chance." In East London, in two or three roads, the larvæ have been such a plague the last three springs that the local authority had to seek advice from the Board of Agriculture for their extermination. This in spite of the fact that the larvæ are not coloured like the foodplant, and there are numerous sparrows in the roads.

With regard to his conclusions, page 98:—

(a). I should say on his own evidence the reverse is the case.

(b). I will follow his example and leave this to the optical surgeon.

(c). I cannot understand how this conclusion could have been arrived at, except to attempt to "nullify the supposed difficulty with regard to the slight difference in modes of flight existing between model and mimic, on which so much stress has been laid," to which he refers.

It is the worst evidence in favour of the "protective resemblance" theory by weeding out if "*the bird's deductive capacity is probably inferior to that of man, and certainly inferior in all-round capacity to that of trained man (e.g., entomologist), who recognises the sitting object as a moth before movement betrays the fact of life.*" I shall have occasion to refer to this declara- of Mr. Curtis's later.

(d). With this I agree, with the reservation that this might apply to the nesting season only, as after the fledging of the young birds the families shift their quarters and start working south.

Mr. Curtis draws my attention to the fact that owls, nightjars and the stone curlews "have a vision modified for their manner of life." No one knows this better than I do, as I have spent many pleasant nights in their haunts, particularly that of the stone curlew, besides watching the latter for hours in the daytime. Mr. Curtis, however, is again mixing up "protective resemblance (cryptic coloration)" and "warning coloration." I did not say that the latter was lost on them, although so far as the suggestion being "gratuitous," I may mention that I spent a most interesting evening in the late spring of 1912 under an arc lamp, at Ventnor, where the bats and an owl were having a splendid time. I saw them repeatedly take *Spilosoma lubricipeda* and *S. menthastri*. I was able to identify them as the bats worked close to the ground, and occasionally I managed to net them. There were numbers of small moths besides *Dicranura vinula* and *Sphinx ligustri*. The bats were as plentiful as the last named, and chased them close to my face, so that I often did not know if I was striking at a bat or a moth. I was not speaking of "warning colours" at all, however, but of "protective resemblance," and I still maintain that it is absurd to suggest that "cryptic coloration" can have any protective value when the moths are flying after dark. With regard to white night-flying moths being instances of "warning coloration," anyone spending an evening around electric arc lamps will easily be able to refute this. I have frequently seen *Leucoma salicis* taken by bats and owls. In fact it has always struck me that white or light coloured moths have a most unfortunate time when flying to light. On page 100, under example 11, Mr. Curtis, after noting various insects taken by birds, says, "I consider that the above cited instances support very materially the view that birds do search for insect food." I have never doubted this, otherwise we should not have insectivorous birds. In a number of the instances recorded, however, the insects were taken in grass, and there is no evidence that they were taken at rest. In the search the bird would move the herbage, disturb the insect, and movement would result in capture.

With regard to the instances of insects taken by birds (pages 99 and 100) referred to above, I submit the following:—

6. Starling (*Sturnus vulgaris*) and *Agriades coridon*. This instance is of no value as evidence for or against "protective resemblance," seeing that the conditions were quite artificial, and with regard to palatability, I have already recorded in the *Entomologist's Record* some years back, in support of Mr. Curtis's note, that I had watched a kestrel feeding on this species at Beachy Head, and also that a pair of stone-chats were feeding their young on them.
7. Song-thrush (*Turdus musicus*) and *Leucania impura*. In this case there is no conclusive evidence that the insect was taken at rest, as last summer and autumn I netted quite a number of *Noctuae* flying in the daytime—*L. pallens*, *L. impura*, *A. oculea*, *L. lithargyria*, *L. conigera*, etc. As they were flying to flowers I accounted for it by the fact that the nights being very cold and windy, when no insects came to sugar or light, they were forced to seek for sustenance in the day time.
9. With regard to the tree-creeper (*Certhia familiaris*), this is just the bird I should expect to take *L. halterata*, or any other insect off tree-trunks, and Mr. Curtis's description of the searching powers of the tit, "such a scrutiny, etc.," would apply equally well here.
11. The house sparrow (*P. domesticus*). I note from this experiment that *Dasychira pudibunda*, a pale night-flying moth, is palatable to the well-fed sparrows. It is certainly not white, but near enough when flying around electric light against a dark background.
12. The robin (*Erithaca rubecula*). I was not aware that the robin's feet were adapted for tree-trunk climbing, except near the base of the trunk, or where ivy or honeysuckle gives a foothold.

The fact of its taking so small an insect as *Tortricodes hyemana*, points to the fact that larger insects would have very little chance of escaping detection. I may here state my firm belief that the sight of birds is much keener than that of human beings. I have myself often seen the house sparrow hover along searching under rail fences and stone copings, and by their success should imagine their sight and "deductive capacity" is not so inferior as Mr. Curtis thinks (page 98, conclusion c). With regard to the Dartford warbler (page 101), which takes "such small fry obtained by a careful and systematic hunt in bushes," surely he would not suggest that this bird would mistake a specimen of the moth *Dasystoma salicella* sitting on a leaf, or a young larva of the alder moth (*Acronicta alni*) for bird droppings. The thoroughness with which this bird carries out its search would also be sufficient to cause movement, which would be fatal, and I imagine no other bird would be deceived either.

The instances of attacks by birds given on page 101, are very useful records of the fact, and the only remark I have to make on them is —why is the bumble bee regarded as distasteful? Surely it is a common object in the shrikes' larder. The hive bee is another insect regarded as distasteful, yet the great tit will sit outside a hive, catch and devour them. With regard to Mr. Curtis's remark on page 126, on the kestrel and *Agriades coridon*, and his suggestion that "it must have been going on for untold centuries," surely it is about time "protective resemblance" stepped in and put a stop to it; or in other words, the kestrel as a species, has surely had long enough to weed out the conspicuous forms, and given us a form that gains "protection" from its surroundings. Again, although these century old attacks have been going on, and in spite of there being no distasteful species present which it can mimic, *A. coridon* survives. On page 126 Mr. Curtis says, "*I do not think it matters whether we ascertain how much protection be afforded by cryptic coloration.*" That is just what is wanted to be found out to justify the term "protective resemblance," and to prove that "cryptic" coloration in butterflies and moths has been brought about by the weeding out of birds. On the same page Mr. Curtis says, "How many people observe these attacks, how many record them? Few of the former, still fewer of the latter . . . . and one may be sure that the entire bird population over the entire area of their residence are doing the same all the time, and the cumulative effect must be very great, etc." If the above goes on and all the birds act as the Dartford warbler did, which Mr. Curtis records on page 101, the result would be extermination. What about "protective resemblance," and why are these insects not distasteful? Mr. Curtis's last paragraph of despair on page 126 is very pathetic, in which he expresses the thought, which is no doubt fathered by the wish to—"close the mouth of the caviller once and for all." I would remind him that it is possible to cavil—for and against, and because certain field naturalists reason things in a different way, it does not follow that they are wrong or less scientific.

Mr. Curtis twits me on page 127 with giving birds "credit for a very small amount of intelligence" because I said of the tits that I doubted if they look for wings at all, but rather the body, and again on the same page he says:—"*Cannot the insectivorous birds be allowed credit for sufficient deductive faculty to enable them to deduce presence of bodies from presence of wings*," yet on page 98 he says, "*the bird's deductive capacity* is probably inferior to that of man, and *certainly inferior* in all-round capacity *to that of trained man* (*e.g.*, entomologist) *who recognises the sitting object as a moth before movement betrays the fact of life*." I think I gave the birds credit for more intelligence than he does in the above. If the birds do not recognise the moth till it moves, how can it deduce presence of bodies from presence of wings of a sitting moth. On the other hand, if the moth moves, "cryptic" colouring is of no use. I may mention that I was thinking of such insects as *Tephrosia bistortata*, *Boarmia consortaria*, *B. gemmaria*, *B. cinctaria*, *Lobophora carpinata* (*lobulata*), etc., which one most commonly finds at rest on tree-trunks, where the bodies are exposed between the flat wings. A tit searches for very small insects on tree-trunks, and, I repeat, would *probably* see the body first, having its eyes focused for small things. The body is the important part to the bird, as it furnishes it with a meal, and the wings are discarded, to the human being the wings have the most interest on account of the markings. With regard to Mr. Curtis's remarks on the oyster-catcher, hawfinch, etc., I am sorry I cannot respond to his invitation to say anything so silly. These instances are not analogous.

I agree that "Dr. Butler rightly comments that man is given to under-estimating the intelligence of the lower creation," especially when it is suggested in support of "protective resemblance" that a bird will mistake a small moth or caterpillar, its food, for excreta of its own kind. With regard to *Gnophos obscuraria*, I am well aware of the habit of this moth in the New Forest, where the earth is dark and the moth dark also. If the dark coloration is "protective," why is it that the moth hides itself in a rabbit burrow? In that position it certainly could not be weeded out by birds. With regard to the Boarmids, I have found *B. roboraria*, *B. consortaria* and *B. repandata*, very "skittish," *B. gemmaria* and *B. cinctaria* not so, with the exception of some worn ♂ s of the latter that have been emerged some time. I cannot see how this nervousness "supports the view that the perfection of colour is due to stringent weeding out." *B. roboraria* is quite easy to see, and I have never had any difficulty in finding as many *B. cinctaria* and *B. gemmaria* as I want. It is movement that is fatal, and if any weeding out takes place, it would be the nervous ones that would be taken, irrespective of colour. With regard to his query, page 128, as to whether I am "sure that everything in nature has a use," I would refer him to my remarks on page 180 in the present paper. I am strongly of opinion that there are many things in nature that have no use to their possessor. Of what use are the markings on leaves and flowers? I am aware that the latter are supposed to guide insects to the nectar and incidentally to bring about fertilization, but then this goes on quite as successfully where the flowers have no marks, or whether the flowers are white or coloured. Of what use is the bloom on grapes, the bloom and markings on a horse-chestnut, or the red colour in a radish? With regard to the green of *L. carpinata* (*lobulata*), to which I referred in my original note, and to which Mr. Curtis refers, page 128, I certainly believe this to be "an extraneous chemical condition not necessary to the survival of the insect." With regard to Mr. Curtis's remark on it, "not sufficiently harmful to be worth eliminating," I wonder who would decide this in nature, and how the elimination would be brought about. My idea is that it is an outward sign of an internal healthy condition. With regard to Mr. Curtis's remark "that copulation has taken place before the green has faded out," this may be so, but it reminds me that I have found *Luperina testacea* freshly emerged after dark and in cop, before the wings of the ♀ are dry, and the eggs have been laid before morning. I have also found *Pachetra leucophaea*, *Triphaena pronuba*, and other moths freshly emerged and in cop. after dark, and visiting them again half-an-hour after have found the ♀ s hard at work ovipositing. In these cases the colour and markings of the wings have no value to the species, seeing that the important function of reproduction has been accomplished. With regard to *L. carpinata* (*lobulata*) not always resting on birch, that is no doubt a fact, but then if it rested on a fence it would be like a "mudsplash," a "mortar splash," or a "broken blister." If it rested on a brown tree-trunk it would be like a green or grey lichen, according to how long it had been out of the pupa. If, however, it were a brown Noctuid moth and rested on a brown tree-trunk, it would be "beautifully protected" (until the tits or tree-creeper came). If, however, it happened to rest on some grey lichen, it would "look like a piece of dislodged bark," and so on. A marvellous game of "heads you win, tails I lose." No matter where the moth rests it is "protective resemblance."

(*To be concluded.*)

Observations on Dr. Verity's Review of the Linnean Collection and his suggested Nomenclatorial Alterations.

By G. T. BETHUNE-BAKER, F.L.S., F.Z.S.

In the *Journal of the Linnean Society* (*Zoology*), vol. xxxii., p. 173, etc., Dr. Verity has set down his conclusions after a very careful survey of the Linnean Collection. Four months have elapsed since the issue of that paper, with a brief criticism by Dr. K. Jordan; during that time I have been endeavouring to reconcile myself to Dr. Verity's drastic changes, but the more I review the situation the more I feel the impossibility of accepting his alterations. The entire paper is based on the assumption that the Linnean specimens are types. He says, "In all cases in which the examination of the *types* seems to necessitate alteration," etc. A type as we understand it to-day was absolutely unknown in the days of Linnæus, and we have no evidence of what species his collection contained at the time of publication of the tenth edition of the *Systema Naturæ*. It is therefore quite impossible to accept the Linnean specimens as *types*, this being so, neither can we consider that the races named are *nimotypical races*, in fact we have some direct evidence that they are not. For instance, in dealing with *Pieris napi*, Dr. Verity says, "Suffice it, then, now to have established that the Scandinavian race is the nimotypical one." To my mind this is very far from being so established. What are the facts of the case? Linnæus had one specimen in his collection in the year 1767. We have no evidence that that specimen was in his possession in 1758 when the insect was named. The whole argument for the changes proposed depends on "the important fact that Linnæus marked in his own interleaved copy of the *Syst. Naturæ*, xiith ed., every species he possessed specimens of." Now had Linnæus marked his own xth edition it would have been more easy to accept at least some of the conclusions arrived at, but we have practically no evidence which of the marked species in the xiith ed. he had when he issued the xth ed., nine years previously, whilst it is generally accepted that he named a large number of species that were not in his own collection—some even from figures then in existence. The description given on p. 468 would suit any *P. napi*; it should also be noted that no habitat is given, but several references are given to plates and figures then in existence, and these can scarcely be said to belong to the Scandinavian form. The references are definite, and no one can say that the one Linnean specimen now in existence is the one from which the description was taken. We must, therefore, take the former and not the latter; to my mind this is the only reasonable course, and it becomes more reasonable still when it is considered that Dr. Verity's purely hypothetical suggestion involves the altering of names known all over the world and in use for a hundred and fifty years. I will now go into a few species in more or less detail.

Papilio podalirius.—This specimen was named in the xth ed. *Syst. Nat.*, p. 436. There is no description, but definite references to works and figures in existence, figures that are quite good representations of the Central European insect. Article 25 of the *International Code on Zoological Nomenclature* on the Law of Priority is as follows:—"The valid name of a genus or species can be only that name under which it was first designated on the condition (*a*) That this name was published and accompanied by an indication, or a definition, or a description. (*b*) That the author has applied the principles of binary nomenclature." Both these conditions are fulfilled in this case, the indication or definition being to certain well known figures, therefore the name is valid for the Central European insect, so the name *sinon* cannot be accepted for that species, and quite certainly *lotteri* cannot be regarded as nimotypical. In this case the adoption of *sinon* to replace *podalirius* (type) is contrary to the *Code*.

Chrysophanus virgaureae (1758).—In his first brief description Linnæus says, "Punctis atris sparsis," which refers to the upperside, and certainly suits best the Spanish form *miegii* vog. v. Sch. In his second and full description he says, "supra fulvis immaculatis," whilst of the ♀ he says, "Subtus primores maculis sparsis atris margine albo-ocellatis posticæ cinerascentes punctis nigris obsoletis." I have never yet seen a specimen in which the spots of the primaries could be called "margine albo ocellatis." Apparently that description was taken from an unusual aberration, but apart from this it suits the form from the Taurus mountains excellently, much better than any other form I know. The fact that the description was taken from an aberration is proved by the "supra primoribus fulvis maculis *sparsis* atris," and certainly the Scandinavian form of the female is by no means "maculis sparsis." It is evident from this that the description does not fit the specimens in the Linnean collection, therefore those specimens cannot be called nimotypical. Consequently Dr. Verity's name *inalpinus* cannot be adopted.

Chrysophanus hippothoë (1761).—This species was described by Linnæus in the second edition, *F. Suecica*, p. 274, and it is of some importance to note that the author specially mentions the "fasciam ad marginem posticum fulvam," a character relied on by Dr. Verity for the race he wishes to call *mirus*. The dividing line between the sub-Alpine form (not *eurybia*) and the Scandinavian form is almost impossible to define. I can pick out from my Swiss and German specimens many that it would be almost impossible to differentiate. It is quite open to students to accept the name *mirus* for the large brilliant form found in many places (besides the Pyrenees and Germany), and found alongside the smaller and duller specimens (no doubt caused by the larvæ being less well nourished); but I am not prepared at present to sink the long known *stieberi* to *hippothoë hippothoë*. I feel that if we are to change long standing names there should be absolutely no doubt on the point, and in this case we have no proof at all that the two Linnean males are the insects from which he drew up his description.

Lycaena idas.—Dr. Verity proposes to substitute this for *L. argyrognomon*, and in the course of his remarks on the species he admits that it is open to another opinion as to whether or not the specimens in question are *argyrognomon* or *argus*, yet he proposes the substitution of names. I have had a little correspondence with Dr. Verity on the matter, and think the case sufficiently important to go carefully into all available details. The species was first mentioned in the 1st ed. *F. Suec.*, pp. 246 and 247 :—

"No. 803 ♂ = *Argus oculatus*."

"No. 804 ♀ = *Argus fuscus*, an præcedentis fœmina? Habitat in ericetis."

The second reference is in the *Systema Naturae*, 10th ed., 1758, p. 483:—

"*Argus*, 152, 803 and 804 F.S.*, in Rhamno, Europæ, Africæ."

"*Idas*, 192, p. 488. P.B. alis nigris concoloribus, punctis 10 flavis ovatis sparsis, in Indiis."

This species is here described under *Papilio Barbarus*, which is a heterogeneous group of species, all of which are stated to come from "in Indiis." The word *Barbarus* evidently indicates merely that they were foreigners, and possibly in some cases that he hardly knew where to place them. The description exactly suits an Indian female of *P. icarus*.

The next reference is the 2nd Ed. of *F. Suecica*, 1761, p. 253:—

"No. 1,074, *argus*, sp. 803."

This is followed on by

"No. 1,075, *idas*, sp. 804, 805."

Here he adopts the name *idas* for No. 804 in the *Systema Naturae*, and makes no reference to the *idas* he described in that work, probably having forgotten it, as it was not in his collection, and in the absence of the type I look upon that *idas* as the female of our *icarus;* but he also adopts the name *idas* for No. 805 of the *F. Suec.* Now 805 and 806 are placed together in the *Syst. Nat.*, under the name "*rubi* 154." It is quite evident that Linnæus himself got mixed up here; there is an error somewhere, for 805 cannot be both *argus* and *rubi*. In the Ed. XII., *Syst. Nat.* (1767), he still uses (wrongly, according to our present ideas, for *idas* was preoccupied in the group) *idas* for *argus* ♀, but he states that it is the female of *argus*.

These are the facts of the case as it now reveals itself to us, and in spite of the fact that Linnæus stated his second *idas* was the female of *argus*, and in spite also of the fact that Dr. Verity himself states that he himself is in doubt as to whether the one specimen is really the ♀ of *argyrognomon*, though he inclines to that opinion, he still ventures to substitute *idas* for the well-established name *argyrognomon*.

I regret I cannot follow him here, though, of course, I certainly accept *ramburi* for *idas*, Ramb. It should be borne in mind that the fact that he had already described a species as *idas* makes a second *idas*, whether blue or brown, impossible from the purely nomenclatorial point of view. A very great many of Dr. Verity's alterations are made on the assumption that the specimens in the Linnean collection are types, and therefore the races are nimotypical. This assumption cannot, I think, bear a minute investigation, and if there is any doubt whatever, I feel strongly that no nomenclatorial change should be made.

Agriades thersites, its distribution and variation in the Rhone Valley.

By B. C. S. WARREN, F.E.S.

In the early spring I had the good fortune to come across *Agriades thersites* on the banks of the Gryonne river. It was very abundant and seemed to be distributed over most of the neighbouring country.

In Dr. Chapman's paper on *A. thersites* (*Trans. Ent. Soc. Lond.*,

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* It will be observed that Linnæus here writes 803 *Argus oculatus*, and 804 *Argus fuscus*.

1912), he says that at the time of writing, the only records of the occurrence of *A. thersites* in the Rhone valley were from Ollon, Visp, and specimens taken by himself in the Val d'Herens. I therefore gave special attention to looking for this species all through the summer, and have in consequence been able to add several more localities for it, namely: at the foot of Les Pleïades above Clarens, Aigle, St. Triphon, Charpigny, most of the fields round St. Triphon Station, all along the banks of the Gryonne river, from where it flows into the Rhone to the other side of the valley, on the main road from St. Triphon to Bex, and rough ground near the railway lines on the Bex side of the Gryonne. In this last locality I took three undoubted specimens of *Polyommatus icarus* var. *icarinus*, in the second brood, the only ones I have seen this year, or so far taken in Switzerland. Between Bex and Sierre *A. thersites* does not seem to occur. I was unable to find any trace of it near Vernayaz, Martigny, Follaterre, or Sierre; but in the Pfyn Wald near the village of Pfyn Mr. Temperley took two ♂ ♂.

In these localities where *A. thersites* is found it is quite abundant, but seems to be strictly confined to places where *Onobrychis sativa*, presumably its foodplant, grows. In most instances here the connection between the two is very marked. To take one example. At the foot of Les Pleïades on a rough patch of ground, about 100 yds. long by 50 broad, there was a lot of *O. sativa* growing, and *A. thersites* was plentiful; but, on either hand, in the fields on the hill side, where *Hirsutina damon*, *Agriades coridon*, *Polyommatus icarus*, *Colias hyale*, etc., were flying in numbers there was not one specimen of *A. thersites*, and though a long search was made, not a single plant of *O. sativa* could be found. One would expect *A. thersites* to occur at Sion, as over miles of country there, on the right bank of the Rhone, amongst acres of orchards and asparagus beds, *O. sativa* grows in profusion over every yard of uncultivated ground, but of course, as it is a very common plant, it naturally grows in many places where *A. thersites* probably does not occur.

As will be seen from the above list, the headquarters of *A. thersites* in this part of the Rhone valley are round St. Triphon, where it spreads over the whole valley. In all these localities it is double-brooded. I first found it by the Gryonne, on April 28th, and during the next few days it became abundant, and lasted on until the very end of May, the second brood appearing about July 18th, and I took the last stragglers of it (2 ♂ ♂ and 1 ♀) on September 19th. All through this time it appeared to renew itself continually, as in spite of the frequent intervals of very bad weather, it was possible to obtain fresh specimens flying with numerous worn ones, up to the end of August and beginning of September.

The specimens in my possession show a considerable tendency to variation, considering the limited area from which they have come, although there is very little difference between the spring and summer broods. On the whole, the ground colour of the ♀ ♀ of the summer brood may be said to be darker than that of the ♀ ♀ of the spring brood; they are also less scaled with blue, and the orange lunules of the forewings are more conspicuous.

In size the ♂ ♂ run slightly larger than the ♀ ♀, varying from 34mm.-38mm. as compared to the 32mm.-34mm. of the ♀ ♀, though one ♀ reaches 38mm. All these measurements are from the centre of the thorax to the apex of the forewing ×2.

The amount of blue scaling on the ♀ ♀ seems to be just as variable as in *Polyommatus icarus*. I feel no doubt that every form of blue-scaled ♀, known to occur in *P. icarus*, will be found to exist in *A. thersites* from different localities. The most usual form here is one heavily scaled with blue on the basal area of all four wings, and with an external edging of blue spots (almost forming a band) round the orange lunules of the hindwings. I have two specimens entirely without blue scaling; some with faint scaling on the fore- and none on the hindwings; others thickly scaled on the hindwings to beyond the discoidal, with only very slight traces of blue on the inner margin of the forewings. The most extreme form I have found here, as yet, is broadly scaled with blue to well beyond the discoidal on all wings, but specimens from the Riviera, in the possession of Mr. Temperley, have the blue extending right up to the margin.

The orange marginal lunules are also very variable. Specimens with a complete series on all wings being rare; while of the other extreme I have only seen one example, which was quite without them, the marginal row of blue spots on the hindwings looking very conspicuous in consequence. The most frequent form here is that with the lunules complete on the hindwings, and represented by only one or two spots at the anal angle of the forewings. It would, however, be quite possible to form a series showing every intermediate form between the two extremes.

In the colouring and markings of the underside, *A. thersites* is much more constant than *P. icarus*. Amongst the ♀ ♀ in my collection the only noticeable variation is in the position of the submedian row of spots, in both wings, which sometimes are quite close to the marginal lunules, and sometimes well in on the wing, almost (in some few cases quite) touching the discoidal. The ♂ ♂ show more variation in the spots themselves. In several cases there is a tendency for the submedian spots of the forewing to lengthen into streaks towards the base of the wing, and in one example spot 3 (from the costa) is lengthened until it touches the discoidal, and spot 2 nearly so, on both forewings. In only one specimen is there any sign of the spots becoming obsolete. It has the forewings normal, but on the hindwings three of the four basal spots are missing, the costal one only remaining; while of the submedian row only three are left, the costal one, and the 3rd and 4th. Some readers may question if this specimen is *A. thersites*, but the position of the apical orange lunule, in connection with the remaining costal spot of the submedian row hindwing, and of the double spot of the submedian row forewing, can leave no doubt on the matter.

As regards the time of appearance of the broods of *A. thersites* and *P. icarus*, the following paragraph is found in Dr. Chapman's paper:—

"Herr Schreiner notes one fact that does not accord with the, certainly somewhat meagre, information I have as to other areas, he says that *alexius* does not appear in either the first or second brood, till the corresponding brood of *alexis* has been long on the wing." This observation of Herr Schreiner's certainly does not accord with the emergence of the species here, as *A. thersites* appeared fourteen days in the spring brood, and about a week in the summer brood, in advance of *P. icarus*.

In numbers, *A. thersites* has far surpassed *P. icarus* this year, in both broods, despite the fact that *P. icarus* is so much more widely distributed. Whether it would be so another year is questionable, for *P. icarus*, in common with many other usually abundant species, has not been at all plentiful this year.

COLEOPTERA.

Note on the occurrence of Euconnus nanus and Euthia schaumi in the Northumberland and Durham area.—*Euconnus nanus*, Schm. —Whilst "warming" out Oribatids from a bag of moss taken in Gibside on April 12th, 1913, an active insect, which looked remarkably like a very small wingless Proctotrypid in shape and movements, attracted my attention. On capture it proved to be a specimen of the above rare and minute beetle, which has only been recorded once—by Dr. Joy—since originally taken in the vicinity of Scarborough by Messrs. Lawson and Wilkinson.

Euthia schaumi, Kies.—On New Year's Day (1913) I took an example of *Euthia schaumi* whilst searching the remaining "bottoms" of the old haystack at Hollinside for *Neuraphes rubicundus*. There was very little stack-refuse left, and the *Neuraphes* (which occurred plentifully early in January, 1911) was not met with on this occasion. *Pseudopsis sulcata* was, however, observed. The above Scydmaenids are interesting additions to the fauna of Northumberland and Durham. —Richard S. Bagnall (F.E.S.), Oxford.

Food-plants of Cassida equestris.—On July 19th, 1913, I found larvæ of *Cassida equestris* in all stages, and some pupæ on *Salvia glutinosa*, at Bourg d'Oisans. Later I met with this plant in various places in the valley of the Romanche, and almost always more or less riddled by this beetle. Early in August I found at Bourg d'Oisans only one or two larvæ, but the beetles were numerous. Mr. Champion tells me that the beetles are *Cassida equestris*, and that he saw them in Surrey about the same date on mint. *Cassida viridis* feeds on thistles, *C. equestris* on various *Labiatae*. The early stages were dealt with by Gravenhorst in 1842, and in 1847 Cornelius described the larva living on *Stachys sylvaticus*, its attachment (on the Continent) to *Salvia* is well known. The pupa is attached to the leaf by retaining a hold of the fixed larva-skin. In the *Ent. Rec.*, xxv., p. 234, Mr. Turner records finding the larvæ of *Cassida viridis* on apparently the same *Salvia glutinosa*. Assuming our Editor for Coleoptera saw Mr. Turner's notes, I hesitate in suggesting that it was *C. equestris* and not *C. viridis*, which he met with, but "I hae ma douts."—T. A. Chapman (M.D.), Betula, Reigate. *September 17th*, 1913. [In spite of the fact that the beetles were small and that they passed the scrutiny of several coleopterists when exhibited, they are no doubt *C. equestris*. The proofs of the two notes on Coleoptera in the last number did *not* reach Mr. Donisthorpe.—H.J.T.]

NOTES ON COLLECTING, Etc.

Colias edusa at Chichester.—During the latter part of August *Colias edusa* was somewhat abundant here. My neighbour, Mr.

Humphrey, took ten in one afternoon. Neither the var. *helice* nor *Colias hyale* has been noticed.—JOSEPH ANDERSON, Chichester, Sussex. *September* 10*th*, 1913.

MELANARGIA IAPYGIA VAR. CLEANTHE IN THE HAUTES-ALPES.—On our way to Digne this year, my wife and I, acting on the advice of Mr. H. Rowland-Brown, stayed a night (June 29th) at Rosans, in the Hautes-Alpes, with the object of searching for *Melanargia iapygia* var. *cleanthe*. Our search was successful, and we took a nice little series; but the insect had clearly been flying for some time, and so many specimens were badly worn that we set free nearly half of our captures. Of those we kept, about half-a-dozen only were quite perfect. The species was flying with *M. galatea* over hay-fields, but it was easy to distinguish the two species on the wing. Var. *cleanthe* is rather a strong flyer, but we did not find it difficult to capture. Our specimens show little variation. —J. N. KEYNES (D.Sc., F.E.S.), Cambridge. *September* 12*th*, 1913.

FOODPLANT OF PYRAMEIS CARDUI.—On August 16th, 1913, between Bourg d'Aru and St. Christophe, in the Venéon Valley, the imagines of *P. cardui*, in fresh condition, were on the wing. I noticed on plants of an *Eryngium*, that I take to be *campestris*, growing on the slopes of the wayside, empty tents that seemed unlikely to be anything but those of *P. cardui* larvæ. After some searching I found one of these occupied by a belated larva of *P. cardui* that had just entered its last instar. This larva I fed up on thistle till it was fullfed, when it sickened and died, as a result doubtless of being kept in a closed tin. *P. cardui* eats a large selection of *Compositae*, and has also been recorded on nettle, *Echium* and Mallow. It is probably a proof of my narrow reading, that I do not remember seeing a record of it on *Eryngium*. It seems, however, that I may assume such records do not abound so as to render another undesirable. The suggestion may be very unorthodox botanically, but one cannot help imagining that *P. cardui* recognises in *Eryngium* some composite rather than umbelliferous characters, beyond the prickly nature, which is reminiscent of thistles. The presence of prickles would hardly attract the butterfly, and the larva no doubt demands a strictly digestive test.—T. A. CHAPMAN, (M.D.). *September* 22*nd*, 1913.

NEWSPAPER ENTOMOLOGY.—I am enclosing the following specimen of "newspaper entomology." I do not know if Lamarck did separate *Nematocera* from other Diptera, but I am pretty certain he did not class them with the *Arachnidae*. Also I do not think that entomologists would endorse the statement that "at the worst he (the "daddy long-legs") is a harmless nuisance.

"'Daddy long-legs.'—An invasion of Suburban Gardens.—'Daddy long-legs' has never been regarded as a pest, but in the suburban garden just now he is something of a nuisance. For some reason or other, and the naturalist declines to hazard an explanation, 'Daddy long-legs' is invading gardens and summer-houses and buzzing across window-panes in unusual force. The children regard him with more approval than others of his tribe, but familiarity is breeding contempt. 'Daddy long-legs' is one of the species Arachnida, which means that he is a spider. At one time he was classed as an insect, but Lamarck separated him from them, and now he is catalogued along with scorpions and mites. His six pairs of legs, long body, and wings, deprive him of much resemblance to the ordinary spider, but there is much in their habits that show that they belong to the same species. Whenever the nights become cold, 'Daddy long-legs' will disappear. At the worst he is a harmless nuisance."—*Pall Mall Gazette* (late Sporting Edition), September 25th, 1913.—H. W. Andrews (F.E.S.), Shirley, Welling, Kent. ("What is a species ? "—H. J. T.)

Myrmica ruginodis, a marriage flight.—While tramping through the pine forests near Nethy Bridge, on August 15th, I came out into a clearing, and noticed at one spot that a number of winged ♀ and ♂ ants of the above species were alighting upon and running about on some of the fir stumps. They were so active in the fierce hot sunshine, and fell off the stumps so quickly into the dense undergrowth of heather and blackberries, that I had much difficulty in capturing a pair actually coupled. I proceeded on, and about a mile nearer home, on one of the forest roads, I found that the centre of the roadway, for a length of some dozen yards, was covered with ♀ ♀ and ♂ ♂ of the same species; all the ♀ ♀ were coupled, and at least three or four other ♂ ♂ were in each case struggling desperately to displace their more successful rivals. Running about amongst these *Myrmica ruginodis* were a couple of winged ♀ *Formica rufa*. I had settled down to watch operations, when I heard the noise of an approaching motor car. I managed to bottle the two *F. rufa* and about half a dozen of the coupled *Myrmica ruginodis*, when a big car rushed over the spot and swept ants and dust (of which, owing to the long drought, there was a thick coating on the roadway) into the air and away in all directions into the undergrowth by the side of the road. It is very rarely motor cars pass along these forest roads, and it was therefore a piece of very bad luck to have one's observations spoilt in this unlooked-for way. The hour of the day was 2.30 p.m., and the air temperature was 75°F., the day being very hot and sultry.—T. Hudson Beare (B.Sc., F.E.S.), 10, Regent Terrace, Edinburgh.

Formica exsecta at Boat of Garten. A new locality.—On August 12th I discovered two strong nests of the above species, near Loch Var, which lies embosomed in the heather clad moor westward of the railway line from Aviemore to Forres *via* Boat of Garten.—Id.

At Harrogate.—The weather has been rather showery here for the past few days and I have only seen *Polia chi*, *Oporabia filigrammaria*, and *Hydroecia micacea*, on the occasional walks I have been able to take.—Stanley Edwards (F.L.S., F.E.S.). *September 20th.*

Drinking habit of Euvanessa antiopa.—I note Mr. Turner's remark on page 235 of the *Ent. Record*, "I am inclined to put *Euvanessa antiopa* down as a drinker." When visiting the suburbs of Montreal and Toronto, at the end of last July and beginning of August, I saw several specimens of this fine insect. They were all flying at the roadside or settling on the roads, and were not difficult to take when thus employed. The roads had in nearly every case been recently watered.—E. G. Whittle, Southend. *September 30th.*

Celastrina argiolus, third brood (?)—During the last few days of September I saw several specimens, both ♂ and ♀, of *Celastrina argiolus* flying in my garden.—J. A. Butterfield (B.Sc., F.E.S.), Plumstead.

Notes from West Surrey.—On September 6th and 7th I spent a week-end in West Surrey, in the neighbourhood of Godalming. The first day was quite cool and dull with a sharp shower or two, so that very few species of Lepidoptera would, or could be made to, come out. Along the sides of the roads and lanes leading to the General's Pond, Puttenham, several colonies of the larvæ of *Gracilaria omisella* were found in bladders in the leaves of the *Artemisia vulgaris.* The larvæ were mostly small, although one was found in its final instar of an orange-red colour. *Hipparchia semele* was seen on the heath practising its habit of settling on the ground, immediately falling over sideways, and *Epinephele tithonus* was met with several times. The long valley leading down to the pond was tenanted at one spot by a very small race of *Coenonympha pamphilus* in some numbers. Not one specimen approached the normal size. One example only of *Plusia gamma* was taken and a Vanessid was seen, which was apparently *Aglais urticae,* but I was not absolutely certain. The second day was warm and sunny, and was taken up with a walk to Highdown, or Highdon as known locally, a wooded hill two or three miles south of Godalming, and then to Hambledon and back through Whitley, nearly the whole way being by footpaths and commons. The neighbourhood of Highdown produced more *H. semele* and *E. tithonus,* with a number of specimens of *Rumicia phlaeas* and *Polyommatus icarus,* the females of the latter species being very much suffused with blue. On Hambledon I was pleased to meet with a *Pararge megaera,* of course of a second brood, and to see *Colias edusa* fly by.—H.J.T.

SOCIETIES.

The South London Entomological and Natural History Society.—*June 26th.*—Larvæ Exhibited.—Mr. Main exhibited pupa and living larva of *Parnassius apollo,* and the larva of the Tiger beetle *Cicindela sylvatica,* from near Meiringen, Switzerland. Galls.—Mr. Coxhead, galls on leaves of beech, and coloured drawings of the same. They were of the Cecidomyiid *Mikiola fagi.* E. cardamines var. turritis.—Mr. A. E. Gibbs, a series of *Euchloë cardamines* from near Messina, Sicily, and pointed out that they were small compared with average British specimens, and were known as *turritis,* in which the apical blotch is not extended beyond the discal spot. Phyllotoma aceris.—Mr. Main said that *Phyllotoma aceris,* the jumping sawfly, was now common in many places in the larval state. The Season.—Messrs. Sich, Adkin, Edwards, Barrett, and Dr. Chapman made remarks on the season, mostly as to the general scarcity of insects.

July 4th.—A Moroccan Tick and Psychid Cases.—Mr. Main, a species of tick from a tortoise of Moroccan origin, the males were small and blackish in colour, while the female was many times larger and of a delicate slate colour; also cases of the Psychid *Acanthopsyche opacella,* from Meiringen. Comparison of various broods of C. argiolus.—Mr. Adkin, series of *Celastrina argiolus:* (*a*) Reared in July and August, 1912; (*b*) reared in April and May, 1913, from the same lot of larvæ from Eynsford; (*c*) reared from Eastbourne larvæ in April and May, 1913. The spring series were much alike, and the females had much less of the heavy bordering of the summer emergence. Exhibit of Australian Papilios.—Mr. Edwards, several species of *Papilio* of the *P. aegeus* group from the Australian region, including the rare *P. gambrisus.* Polistes nest.—Mr. Blair, a nest of the wasp *Polistes gallica* from Meiringen, with the living female. COMPARISON OF SIZES OF LEPIDOPTERA CAPTURED THIS YEAR WITH THOSE OF OTHER YEARS.—Mr. Barrett and others remarked on the comparative sizes of the captures of other seasons with the present. Some members considered that imagines were smaller this year, while others thought that they were quite up to the average size.

July 24*th*.—A RARE ERYCINID.—Mr. Edwards exhibited a pair of the Erycinid, *Stalachtis evelina*, from the Lower Amazons. INSECT PESTS. —Mr. Adkin, *Borkhausenia pseudospretella*, bred from hare's hair. Mr. West, a series of the Coleopteron *Anobium paniceum*, found destroying tobacco leaves by Mr. Adkin. VARIATION IN ♀ P. ICARUS AT DORKING.—Mr. Curwen, some 15 examples of *Polyommatus icarus* from near Dorking, showing much variation in the spotting and coalescence of the spots on the under surface. PARASITES OF O. ANTIQUA.—Mr. Hugh Main, parasites of the larva of *Orgyia antiqua*, and the larva of the large water beetle *Hydrous piceus*. LARVA OF H. EUPHORBIAE.—Mr. Ashdown, the larva of *Hyles euphorbiae* from Switzerland. MIGRATION.—Mr. Barrett read a note on the Migration of Butterflies, *Aporia crataegi* and *Pieris brassicae*, in Sicily.

August 14*th*.—S. URTICÆ AT EASTBOURNE.—Mr. Adkin, a series of *Spilosoma urticae* reared from larvæ taken at Eastbourne in the autumn of 1912. VARIATION IN H. DAEDALUS.—Mr. Edwards, varied examples of the African *Hamanumida daedalus*, pointing out the extreme response of the underside markings to the environment, and the pupa of *Tipula oleracea*, the common "daddy-longlegs." COMPARISON OF SWISS AND SICILIAN BUTTERFLIES, AND PUPA OF N. TYPHÆ AND N. SPARGANII IN SITÛ.—Mr. Barrett, Sicilian and Swiss *Satyrus hermione*, the former the larger, *Raywardia telicanus* and *Lampides boeticus* from Sicily, and the pupæ of *Nonagria sparganii* and *N. typhae in sitû*, head upwards in the former, downward in the latter. GALL CAUSED BY ICTERANA.—Mr. Dennis, a gall on Plantain caused by *Tortrix icterana*. FIELD REPORTS.—Mr. Curwen said that *Colias edusa* was common at Mickleham on August 10th, and specimens of *Nisoniades tages* were also obtained on the same date.

August 28*th*—LIVING ANT-LION.—Mr. Main exhibited the living imago of an ant-lion which he had bred from a larva obtained in Switzerland in June last. It was a female, and while held would feed on flies presented to it. EXHIBIT OF ORTHOPTERA AND THE RARE T. FASCIATA.—Mr. West, the Orthoptera, *Thamnotrizon cinereus* and *Forficula auricularia* var. *forcipata*, from Dartford, and on behalf of Mr. Carr, the rare Coleopteron *Trichius fasciatus* from Mid-Wales. ABERRATION OF A. EXCLAMATIONIS.—Mr. Adkin, a specimen of *Agrotis exclamationis* from Lewisham, in which the reniform and orbicular stigmata were united. AUTUMN CAPTURES. —Mr. Dunster, *Colias edusa* from Lyme Regis, *P. atalanta*, *P. cardui* and *V. io* from Crewkerne, with *Epione apiciaria*, *Mesoleuca ocellata*, etc., from the same locality. LOCAL SWISS BUTTERFLIES EXHIBITED.—Mr. Curwen, series of *Polyommatus escheri* and *Lycaena sephyrus* var. *lycidas* from Switzerland. OVA OF B. GEMMARIA CURIOUSLY PLACED.—Mr. Carr, ova of *Boarmia gemmaria* deposited in a box among ova of one of the "thorns." INTERESTING COLEOPTERA FROM THE TYROL, ETC.—Mr. Turner, specimens of the Coleopteron *Cetonia aurata* from Cortina, *Cassida equestris* bred from larvæ on a *Salvia* near Konigs See, Bavaria, and a nest of a wasp taken from a wall on the road leading from Cortina to Pieve di Cadore. T. BISELLIELLA IN THE ZOOLOGICAL GARDENS.—Mr. Sich reported the occurrence of a Tineid, *Tineola biselliella*, in some numbers in the Indian rat-snake's den at the Zoological Gardens. REMARKABLE INSTINCT OF VESPA GERMANICA.—Mr. Step read a communication describing how wasps (*Vespa germanica*) deliberately cut holes through some tennis netting which had impeded the direct road to their nest in his garden.

September 11th.—HYLES EUPHORBIÆ.—Mr. Ashdown exhibited the imago of *Hyles euphorbiae* bred from a larva taken at Aigle, Switzerland. MAMESTRA PISI IN A LONDON GARDEN.—Mr. Turner, a larva of *Mamestra pisi* from New Cross, feeding on Michaelmas Daisy. LAPLAND HETEROCERA, 1911-12.—Mr. Sheldon, a collection of Heterocera taken in the Arctic areas of Norway and Sweden in 1911-12. Of the eighteen species shown, ten are to be found in the British Fauna. Species like *Plusia hochenwarthii*, *Anthrocera exulans* var. *vanadis*, *Psodos coracina* (*trepidaria*), etc., found in the high Alps, occurred there near sea-level. BRITISH SPECIES OF VESPA.—Mr. West (Greenwich), examples of the wasps *Vespa germanica*, *V. sylvestris* and *V. vulgaris* to show the specific characters. Mr. Step, specimens of *V. germanica* and *V. vulgaris* to show the difference in the appearance of the face. SPECIES OF LOWEIA.—Mr. Curwen, a series of *Loweia alciphron* var. *gordius* from Iselle, showing much variation in intensity of ground colour, and a short series of *L. amphidamas* from Caux, near Montreux. AUTUMN CAPTURES.—Mr. Carr, the large spider *Epeira quadrata* from Crockham Hill, on heather, and reported *Asphalia diluta* common at sugar, *Noctua glareosa* common, and *Agrotis agathina* fairly common. Mr. Sich reported *Carpocapsa pomonella* as abundant. Mr. Tonge reported larvæ of *Nonagria typhae* at Deal to be extensively parasitized this season. Mr. Smith reported *Phryxus livornica* as occurring for the third year in succession at the Lizard, and also specimens of *Leucania vitellina*. *Agrotis lunigera* were in some numbers in the same locality.

ENTOMOLOGICAL SOCIETY OF LONDON.—*May 7th.*—Mr. G. T. Bethune-Baker, President, in the Chair. Mr. Charles C. Best-Gardner, of Rookwood, Neath, Glamorgan, was elected a Fellow of the Society. OBITUARY.—The President announced the death of Mr. Herbert Druce, F.L.S.—A RARE WEEVIL.—Commander J. J. Walker exhibited a series of *Acalyptus carpini*, Fr., var. *rufipennis*, Gyll., taken on and about a sallow-bush at Weston-on-the-Green, Oxon, in April, 1913. AN ALBINO OF TÆNIOCAMPA GRACILIS.—Mr. N. Charles Rothschild exhibited an example of *Taeniocampa gracilis*, captured in April this year at Wood Walton Fen, Hunts, white all over, without any markings whatever. A NEW BRITISH ANT.—Mr. Donisthorpe exhibited a form of *Lasius affinis*, Schenck, an ant new to Britain, of which he had found a colony at Tenby in South Wales, on the sand-hills, on April 24th this year. SCALES OF CNETHOCAMPA PITYOCAMPA.—Mr. H. Eltringham exhibited a number of the scales composing the anal tuft of *Cnethocampa pityocampa*, Schiff., remarkable as being the largest scales known in any lepidopterous insect. THE FEMALE FORMS OF PAPILIO POLYTES, L., IN THE HONG-KONG DISTRICT.—Prof. Poulton exhibited four males and six females of *Papilio polytes*, L., captured on Stonecutters' Island in Hong-Kong Harbour. All the females were of the male-like form *cyrus*, Hübn. A FAMILY OF PAPILIO DARDANUS, BROWN, BRED FROM EGGS LAID BY A PLANEMOIDES, TRIMEN, FEMALE.—Prof. Poulton read extracts from letters received from Dr. G. D. H. Carpenter, telling of his success in obtaining, for the first time, fertile ova from a *planemoides* female of *P. dardanus*. Three *planemoides* and seven *hippocoon* females had been bred from these eggs. WINGS OF DANAINE AND EUPLOEINE BUTTERFLIES KILLED BY BIRDS IN CEYLON.—Mr. J. C. F. Fryer exhibited a large series of the wings of Danaine and Euploeine butterflies from Ceylon, remains of those insects which had been observed by him to be eaten by birds, mainly by the so-called "Wood-Swallow," *Artamus fuscus*; also a few specimens of the same butterflies which had been killed by *Asilidae*, these being distinguished by the fact that the bodies were nearly or quite intact. The following papers were read:—"On the British *Mycetophilidae*," by F. W. Edwards, F.E.S. "*Culicidae* from Papua," by Frank H. Taylor, F.E.S. "Pupal Coloration in *Papilio polytes*," and "The larval habits of the Tineid moth *Melasina energa*, Meyr.," by J. C. F. Fryer, M.A., F.E.S.

June 4th.—ROYAL PATRONAGE.—The President announced that His Majesty the King had been graciously pleased to become Patron of the Society. The death of Lord Avebury, the oldest Fellow of the Society, was announced, and also that of Mr. Philip de la Garde. ELECTION.—Capt. F. Sitwell, Wooler, Northumberland, was elected a Fellow of the Society. A SCARCE ABERRATION OF RHYNCHITES AENEOVIRENS.—Mr. C. O. Waterhouse exhibited a blue variety of the female of *Rhynchites aeneovirens* recently taken at Burnham Beeches. TATOCHILA IMMACULATA, Röb.—Dr. F. A. Dixey exhibited a male and female specimen of *Tatochila immaculata*, Röber, with a pair of *T. stigmadice*, Stdgr., for comparison. ANTS AND THEIR GUESTS.—Mr. Donisthorrpe exhibited a fine series of *Claviger longicornis*, Mull. (including live specimens), with its proper host *Lasius umbratus-mixtus*, with which he had taken it at Box Hill on May 16th and 23rd. BRITISH ANERGATES ATRATULUS, SCH.—Mr. W. C. Crawley exhibited ♂, virgin ♀, fully developed fecund queen, and a partly-developed queen of *Anergates atratulus*, Sch., taken for the first time in Britain, July 1912, New Forest. THE RESEMBLANCE BETWEEN THE UNDER SURFACE OF MANY SPECIES OF MELITÆA AND THAT OF CERTAIN PALAEARCTIC HESPERIDÆ.—Prof. Poulton called attention to the striking resemblance between the parts of the underside exposed during rest of many species of *Melitaea* and certain *Hesperidae*—especially the large species *H. antonia*, Spey., *H. sidae*, Esp., and to a less extent *H. carthami*, Hübn. TWO ALGERIAN DIPTERA—AN ASILID AND AN ONCODID.—Prof. Poulton exhibited a female of the Asilid fly *Heligmoneura brunipes*, F. (*Asilus castanipes*, Meigen), together with the Oncodid (Cyrtid) fly *Physegaster maculatus*, Macq., both from Batna, Algeria—the Asilid dated July 2nd, 1909. Neither of these was present in the British Museum collection. A LOCUSTID AND A REDUVIID MIMIC OF A FOSSORIAL ACULEATE IN THE S. PAOLO DISTRICT OF BRAZIL.—Prof. Poulton exhibited on behalf of Dr. Adalbert Seitz, F.E.S., the Fossorial model *Pepsis sapphirus*, Pal. de Beauv., and two of its mimics—the Reduviid bug *Spiniger ater*, Lep. and Serv., and the Locustid (Phasgoneurid) *Scaphura nigra*, Thunb., var. *virgorsii*, Kirb. A PALE TÆNIOCAMPA GRACILIS.—Mr. J. C. F. Fryer exhibited a light specimen of *Taeniocampa gracilis* for comparison with that exhibited at the last meeting by the Hon. N. C. Rothschild. THALPOCHARES OSTRINA FROM PAIGNTON.—Comm. J. J. Walker exhibited, on behalf of Dr. R. C. L. Perkins, a specimen of *Thalpochares ostrina* Hübn., var. *carthami*, H.S., apparently freshly emerged from pupa, taken by Dr. Perkins at Paignton on June 1st, 1913. A SINGLE BATCH OF CELASTRINA ARGIOLUS EMERGING IN AUTUMN AND SPRING.—The President showed 33 specimens of *Celastrina argiolus* bred from one batch of eggs, sixteen of which emerged last autumn and seventeen in May of this year. SYNEPIGONIC SERIES OF PAPILIO DARDANUS, FROM PARENT FORM PLANEMOIDES.—Dr. G. D. H. Carpenter gave an account of a brood of *Papilio dardanus* raised by him from eggs laid by a ♀ of the *planemoides* form, consisting of 22 specimens, seven *hippocoon*, three *planemoides*, the rest males. INSECTS AND ASCLEPIADACEÆ.—Dr. K. Jordan showed a Swallow-tail (*Papilio thoas* sub-sp. *thoantides*), a Hawk-moth (*Protoparce diffissa*) and a Honey-bee (*Apis mellifica*), which were found dead at Buenos Ayres on *Araujia albens*, being caught by their proboscis in the flowers of that plant. STRIDULATING PUPA.—Dr. K. Jordan also exhibited, on behalf on Prof. Seitz, the cocoon and chrysalis of a Noctuid from China. The pupa bears dorsally at the base of the last segment a patch of sharp longitudinal ridges, and there are corresponding ridges on the inside of the cocoon. This stridulating apparatus enables the pupa to produce a loud chirping continued sound. A USEFUL APPARATUS.—Dr. G. B. Longstaff exhibited a simple apparatus which he had designed, with the assistance of Mr. H. Eltringham, to turn over several butterflies at once, so as to display alternately the upper- and under-sides. It was manufactured by W. Watson and Son, 313, High Holborn. BEE AND PARASITE.—Dr. Longstaff also exhibited a small bee (*Andrena*, sp.) with a Coleopterous larva, apparently a Meloid, partly on, partly in its abdomen. Captured near Seville, Spain, April 15th, 1913. PAPERS.—"On the relationship between certain West African Insects, especially Ants, Lepidoptera and Homoptera," by W. A. Lamborn, M.R.C.S., L.R.C.P., F.E.S., Entomologist to the Agricultural Department of Southern Nigeria. With an Appendix containing descriptions of New Species by G. T. Bethune-Baker, Pres. Ent. Soc., W. L. Distant, J. Hartley Durrant, and Prof. R. Newstead, F.R.S. "Supplementary notes on new or little-known forms of *Acraea*," by H. Eltringham, M.A., F.Z.S. With description of a new form of *Acraea encedon* by Prof. E. B. Poulton, D.Sc., F.R.S.

REVIEWS AND NOTICES OF BOOKS.

"*A Preliminary Report of the Temperature reached in Army Biscuits during Baking, especially with reference to the destruction of the Imported Flour-moth, Ephestia kühniella, Zell.*" By J. Hartley Durrant, F.E.S., and Lieut.-Col. W. W. O. Beveridge, D.S.O., R.A.M.C. (with seven plates).—This is a Report of probably one of the most important pieces of economic entomological work which has been done in this country for many years past. In spite of precautions, increasing in vigilance each year, to obviate the ravages of moths and beetles, it has hitherto been impossible to prevent the more or less extensive depredations of certain insects on our army stores. Minute and careful observation soon proved that the species of Lepidoptera mainly involved were *Ephestia küh-*

niella and *Corcyra cephalonica*, besides two or three other species of *Ephestia*. A number of species of Coleoptera also occur, but the bulk of the damage to the biscuits was caused by the first species. Closely sealed tins, which had been in a colonial depot for some time, when opened were found to contain only a mass of debris and dead moths. Careful investigation during the manufacture and packing of the biscuits showed that the only possible period of access for the moths was while the biscuits were cooling from the oven previous to packing, when even a few perfect insects could do incalculable damage by depositing their ova on a very small percentage of the biscuits, either when spread over the cooling chambers, or when collected for packing. Early in the enquiry it was necessary to ascertain what the temperature of the biscuit was during the twenty minutes it was travelling through the oven. By means of a carefully conceived arrangement of a thermocouple and a millivoltmeter, it was found that although the temperature of the oven was always very considerably above boiling point, that of the inside of the biscuit was never above that point. Since a temperature of 69° for twelve minutes was found sufficient to cause ova to fail to survive, and that access was obviously impossible after the sealing of the tins, the cooling and packing periods were the critical times to be put under a more perfect control. As yet the actual lowest temperature sufficient to sterilise the ova has not been ascertained, and it is put forward as a practical suggestion that screened cold air be introduced to cool the biscuits, and at the same time to make it a physical impossibility for any moth to pair and oviposit, and to remove any intruding moth by revolving fans, etc. One or two important biological points came out during the experiments. It was found that *Ephestia kühniella* responded most readily to temperature, for while it took on the average 158 days to go through its metamorphoses in the British Museum, at an average temperature of 63°F, when kept under observation at Washington, U.S.A., at an average temperature of 82°F, the period might be as short as 38 days. This ready response to heat suggested that the native habitat of the species must be a more tropical area than the Mediterranean coasts. It is now practically certain that the original home of this moth is the upland of Guatemala. Mr. C. G. Champion records it from Panajachel, Guatemala, 3,000ft., December 30th, 1880, in a flour-mill of the house he stayed at for some time. This is the earliest date with a definite locality, although Zeller described and named the species from a specimen taken at Halle in 1877, and supposed to have been introduced from America in meal. It will be noticed that *E. kühniella* is now spoken of as the "imported flour-moth," and not the "Mediterranean flour-moth" as formerly. It was also proved that *Corcyra cephalonica* was an oriental species introduced freely with Rangoon rice. The Report concludes with a complete bibliography and the synonymy with the descriptions of the moths concerned. In addition there are five plates with figures of the imagines, larvæ and pupæ, with details of the characters of the head and wing neuration, drawn by Mr. Durrant. It is needless to say how well this work is done, for those who know the name of J. H. Durrant are assured of the high and efficient character of the Report.—H.J.T.

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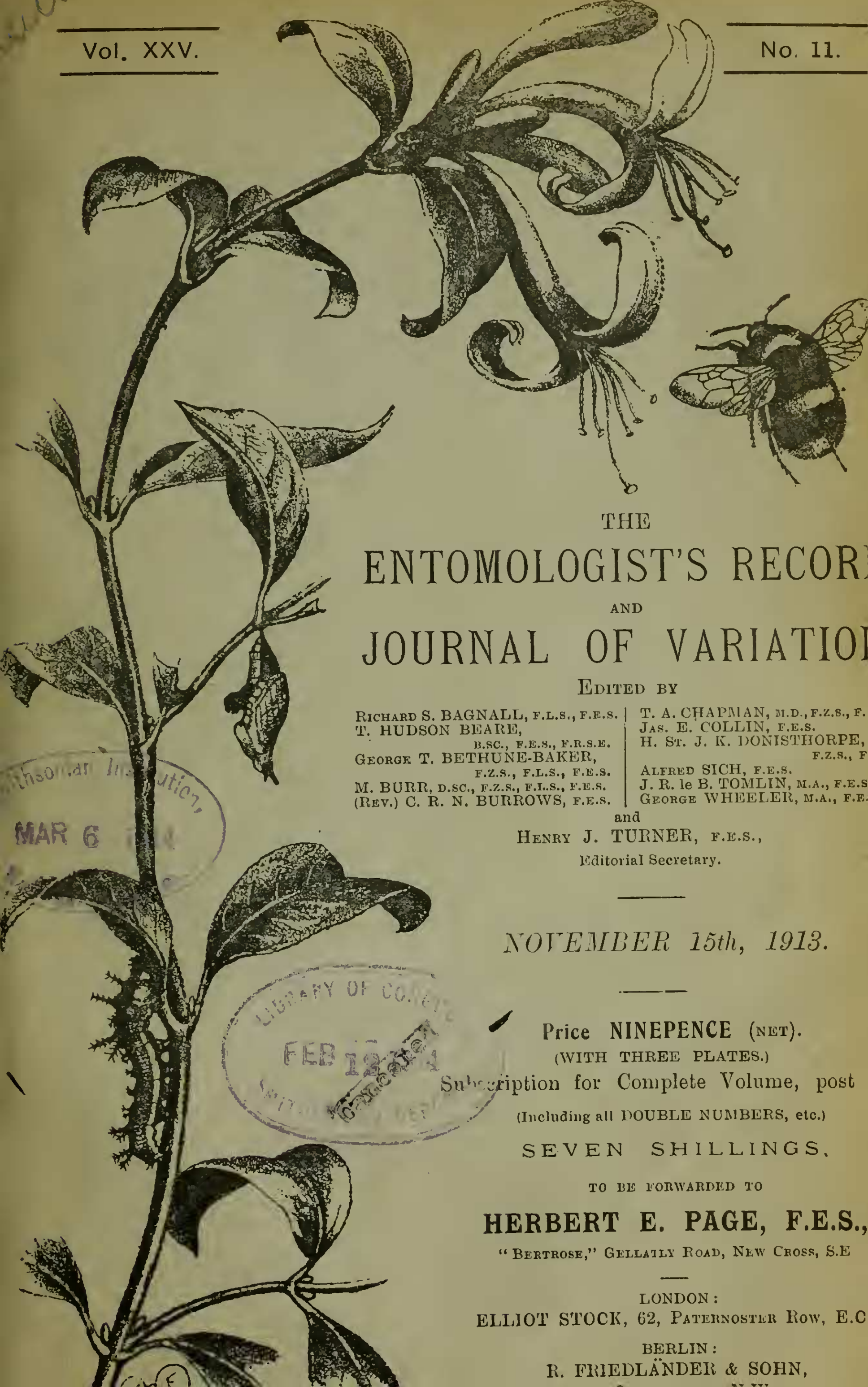

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The Lighthouse, South Point, Lundy Island.

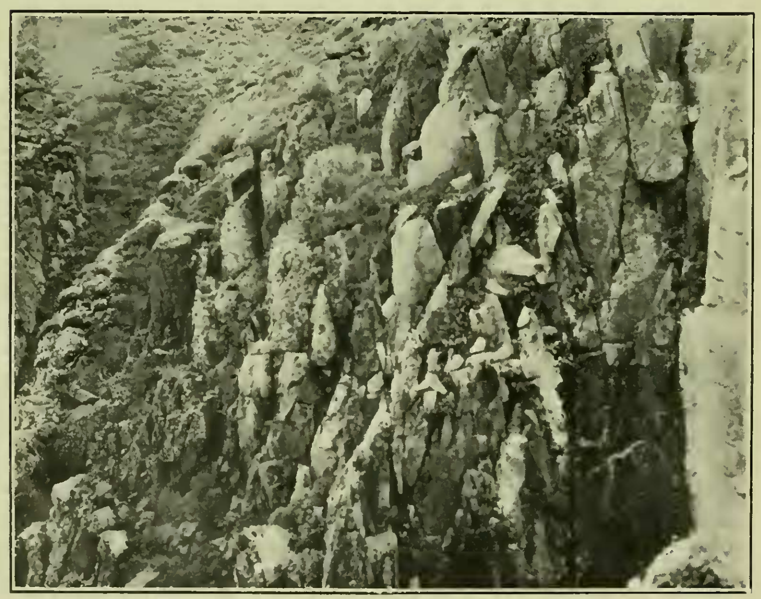

Photo. H. Donisthorpe.

Birds at the North Point, Lundy Island.

The Rocking Stone, Lundy Island.

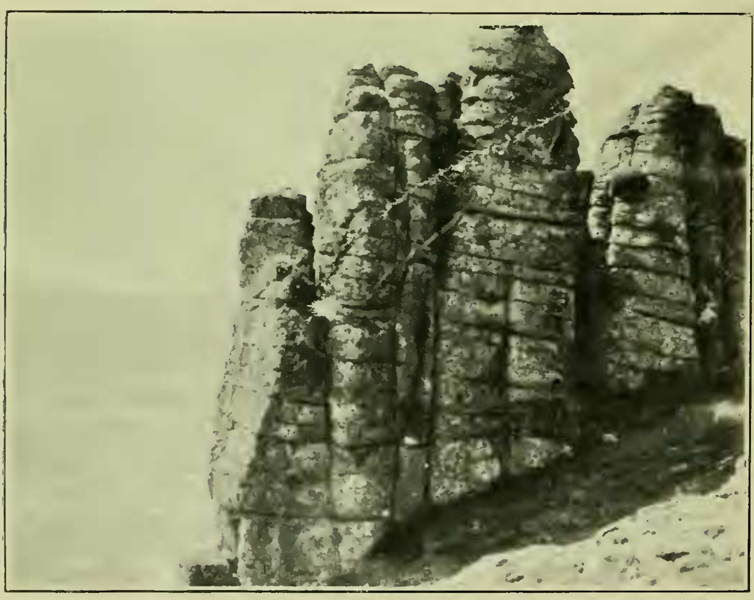

Photo. H. Donisthorpe.

The "Cheese Rings," Lundy Island.

Coleoptera in Lundy Island (*with plate*).

By ROBERT S. MITFORD, C.B., F.E.S.

My friend Mr. Donisthorpe and I, having had for some years past a great desire to visit Lundy Island in search of Coleoptera, more especially with the view of endeavouring to add further species to the list published by Messrs. Joy and Tomlin in the *Ent. Mo. Mag.*, for 1906 (page 1) and 1907 (page 27), decided early this summer to carry out our wish. Accordingly we left London on Sunday, June 8th, for Bideford, where we put up for the night at the Royal Hotel, famous for its associations with the Rev. Charles Kingsley. The next morning we left Bideford at 7.30 a.m. by the s.s. "Devonia," a small 80 ton cargo boat absolutely devoid of any accommodation for passengers, and after a most uncomfortable and somewhat tempestuous passage, the discomfort of which, however, seemed in no way to affect my companion, we reached the one and only landing place on Lundy Island, at 11.20 a.m. Here we were met by Mr. Allday, the Postmaster, who had arranged to lodge us at his cottage on the east side of the Island, about a mile and a half from the landing place, and we cannot speak too highly of the kindness and attention which we received from him and his wife and daughter, all of whom made us most comfortable during our stay.

We remained on the Island nine days, and explored every part of it, with the result that we are enabled to add 39 species to the lists above referred to. *Ceuthorrhynchus contractus*, Marsh., and its var. *pallipes*, Crotch, abounded on wild cabbage, and *Psylliodes luridipennis*, Kuts., was found on the same plant, both in the south-eastern part of the Island, and more plentifully on wild cabbage growing on the east cliff on the northern side of the Postmaster's cottage, near a fine pinnacle on the cliff locally known as the "Rocking-stone." Long and careful search on the cliffs near and round the lighthouse at the southern point of the Island and along the western cliffs, failed to reveal a single specimen of the local *Cardiophorus erichsoni*, Buys., much to our disappointment, but Mr. Donisthorpe had the good fortune to sweep one in a densely overgrown ravine in front of the old Manor house. We were doubtless too late for this insect. *Melanotus rufipes*, Hbst., was plentiful at the northern point of the Island, as also was *Athous haemorrhoidalis*, F., the male specimens taken of the latter beetle being of a very small form, chiefly dark in colour. The only female taken differs from the type in that—besides being much smaller and darker—the thorax is reddish, the posterior part and two longitudinal stripes in the centre being black. Here also it was curious to see *Cetonia aurata*, L., in abundance flying about amongst the rocks. This species was also seen near the old Manor house. Several examples of *Corymbites aeneus*, L., including the blue form, were taken at rest on the steps leading down the cliff to the northern lighthouse, and on the lighthouse walls.

By tearing up and carefully searching the roots of a yellowish withered-looking grass (*Holcus lanatus*, meadow soft grass) on the north-western cliffs, *Melanophthalma distinguenda*, Com., was found in plenty, together with *Caenopsis waltoni*, Boh. *Neuraphes sparshalli*, Den., *Scydmaenus collaris*, Müll., and *Scydmaenus pusillus*, Müll., and one of the last-named species was taken in a nest of the Common Gull together with *Gnathoncus punctulatus*, Th., *Homalota nigricornis*, Th., in abundance, and a few specimens of *Cholera watsoni*, Spence. Of *Trachyphloeus laticollis*, Boh., we only captured one specimen, which curiously enough was found in an ant's nest under a stone.

At low tide an examination of the rock pools at the Southern extremity of the Island produced *Helophorus aeneipennis*, Th., *Ochthebius lejolisi*, Muls., *Bledius opacus*, Bloch., and *Micralymma brevipenne*, Gyll. We have also to record the capture of a black var. of *Bembidium lampros*, Hbst., but we failed to meet with *Stenus ossium*, Steph., or its var. *insularis*, Joy. Amongst other interesting captures we may mention that at the roots of a large tuft of the common-thrift and also under pieces of slate lying at the old battery on the West Cliffs we found some fine specimens of a large earwig, both ♂ ♂ and ♀ ♀. We sent examples of these to Dr. Malcolm Burr, who was good enough to inform us that the insect was a large variety of the common earwig, *Forficula auricularia* var. *forcipata*, Steph., and that it especially occurs in islands and on mountains. It is fully described and figured by Dr. Burr in the *Ent. Mo. Mag.*, for 1907, page 173, and 1911, pp. 225, 226. We also secured specimens of the slug *Arion hortensis*, Fer., a large slug of a pale yellowish testaceous colour, with a dark brown stripe on each side, and one of the pigmy shrew. These were presented to the Natural History Museum, and we take this opportunity of expressing our thanks to Mr. Oldfield Thomas and also to Mr. Morson, assistant in the Department of Zoology, who kindly assisted us by determining the identity of the slug.

The countless number of sea birds and their breeding haunts afforded us a spectacle of fascinating interest. The Lesser Black-backed Gull (two pairs only), the Common Gull, the Kittiwake Gull, Puffins, Guillemots, and Razorbills were all nesting, and by clambering down the rocky slopes of the Northern point, where the chief breeding places are, we were able to get amongst the birds and to observe them at close quarters.

The puffins were literally in thousands, and appeared to have little fear of man, for they would emerge from their holes as we climbed about and sit on the rocks close to us. We caught one as it emerged from its nest and examined it for *Mallophaga* or *Siphonaptera*, which Mr. Donisthorpe was anxious to obtain for Mr. Rothschild, but without result, as the bird was entirely free from either pest. We also shook out, sifted, and examined a nest of the Common Gull with similar results as regards *Siphonaptera*. The sight of these clouds of birds, their close proximity to the observers, and the beauty of their flights, combined with the romantic scenery of the cliffs, surrounded by the mighty Atlantic Ocean, formed a picture which will long remain in our memory, and Mr. Donisthorpe succeeded in taking some excellent photographs of these enchanting scenes as well as of other points of interest. On June 19th we again boarded the "Devonia," and had a calm and pleasant passage back to Bideford, having had delightful weather during the whole of our stay on this lonely island.

We cannot conclude this brief account of our expedition without placing on record our appreciation of the kindness and courtesy shown us by Mr. Heaven, the genial Squire of Lundy, to whom we are glad to tender our grateful thanks for much valuable information and assistance, and for affording us every facility for pursuing our researches, thereby adding considerably to the pleasure and interest of our visit.

A list is appended of the 39 additional species taken by us, thus bringing up the total number of species, so far recorded from Lundy, to 501.

Harpalus rupicola, Stm.
Bembidium lampros, Hbst. (black var.)
Hydroporus pubescens, Gyll.
Hydroporus lituratus, F.
Octhebius lejolisi, Muls.
Homalota nigricornis, Th.
Homalota clancula, Er.
Conosoma lividum, Er.
Megacronus cingulatus, Man.
Mycetoporus angularis, Rey.
Quedius nigriceps, Kr.
Philonthus marginatus, F.
Philonthus varians, Pk.
Othius laeviusculus, Steph.
Lathrobium geminum, Kr.
Lathrobium multipunctum, Gr.
Sunius diversus, Aub.
Stenus erichsoni, Rye.
Bledius opacus, Block.
Oxytelus sculptus, Gr.
Micralymma brevipenne, Gyll.
Anisotoma calcarata, Er.
Cholera chrysomeloides, Pz.
Neuraphes sparshalli, Den.
Scydmaenus pusillus, Müll.
Gnathoncus punctulatus, Th.
Saprinus nitidulus, Pk.
Corymbites aeneus, L.
Telephorus bicolor, F.
Rhagonycha limbata, Th.
Malthinus fasciatus, Ol.
Longitarsus pellucidus, Foud.
Mantura chrysanthemi, Koch., var. *crotchi*, Al.
Crepidodera transversa, Marsh.
Rhynchites minutus, Hbst.
Strophosomus coryli, F.
Hypera rumicis, L.
Sibinia sodalis, Germ.
Rhinoncus castor, F.

Ants and Myrmecophiles on Lundy (*with plate*).

By HORACE DONISTHORPE, F.Z.S., F.E.S.

The only records of ants from the Isle of Lundy, that I can find, are by the late F. Smith, who visited the Island twice in August, 1869, chiefly in search of Hymenoptera, and found the following species:—*Myrmica ruginodis*, *Lasius niger*, *L. flavus*, and *Formica fusca* (*Ent. Ann.*, 1870, p. 24), and again in 1874, when he adds *Lasius alienus* and *Formica cunicularia* [*Ent. Mo. Mag.*, xi., 111. (1874)]. Having spent some nine days, as stated above by my friend Mr. Mitford, on Lundy, and having paid particular attention to ants' nests and their inhabitants, I am able to add a few species to the above lists, and also to record a certain number of Myrmecophilous creatures noticed.

Myrmica ruginodis, Nyl.—Not uncommon under stones.

M. laevinodis, Nyl.—Scarce.

M. ruginodis var. *laevinodo-ruginodis*, Forel.—One colony found.

M. scabrinodis, Nyl.—Not uncommon. The Aphis *Forda formicaria* was taken in one nest.

M. scabrinodis var. *sabuleti*, Mein.—Several colonies observed.

Tetramorium caespitum, L.—A number of colonies occurred, some being very large ones, under stones in different parts of the Island. They contained larvæ of various sizes and ☿ pupæ, and in one nest sex pupæ also, and a deälated ♀ was present in another. In one colony all the ☿ ☿ were very large and dark in colour, and no ♀ or brood was observed. The ground was very difficult to dig up, and nothing else was found, though the nest might well have contained an *Anergates-Tetramorium* colony. Two small spiders taken with this ant on June 11th and 12th are considered by Dr. A. Randell Jackson to be *Acartauchenius scurrilis*, Cbr. This little species, which is new to Britain, is recorded by Wasmann with the same ant from the Rhineland and Bohemia. The *Aphidae*, *Pentaphis marginalis* and *Forda formicaria* were found, and in several nests a large number of *Paracletus cimiciformis*. The *Acarus*, *Laelaps equitans* was observed riding on the ants. *Platyarthrus hoffmanseggi*, *Beckia albina*, and a Proctotrupid not yet named completes the list of myrmecophiles found with *Tetramorium*. In three different nests a number of seeds were found, which Prof. Weise tells me are a *Cerastium* sp. ?

Lasius niger, L.—Common. *Drusilla canaliculata* occurred in one nest.

Lasius alienus, Först.—Not uncommon. The *Aphidae*, *Geoica carnosa* and *Trama troglodytes*, and the Coccid *Ripersia subterranea*, occurred in these nests. *Peyerimhoffia brachyptera*, Kieffer, an abberant *Sciara*, with short wings, was found in the galleries of one nest in June. This is its first record for Britain, and only two specimens taken by Mons. Peyerimhoff in Algeria have hitherto been recorded. *Trachyuropoda excavata*, Wasm. ? A number of a small *Acarus*, which appear to me to be this species, occurred in one nest.

Lasius flavus, F.—Common. Eggs, larvæ, and ♂, ♀, and ☿ pupæ were present in most of the nests. In one very large colony three deälated ♀ ♀ were found; this is very unusual; indeed, in our paper on the founding of colonies by queen ants, read at the International Entomological Congress for 1912, Crawley and I state that, "Certainly, we know of no case where more than two females have been found in one nest." This does not apply to virgin females, or deälated ♀ ♀ gathered together after the marriage flight, but in a well-established colony such as the above. A Proctotrupid not yet determined, *Beckia albina*, and the *Aphidae*, *Tycheoides hirsutum*, N. S., *Tetraneura ulmi* and *Macrosiphum*, N. S. (Theobald, MS.), were found at large in nests of this ant, and the Acarus *Cillibano comata*, fastened on the larvæ.

Lasius mixtus, Nyl.—Two colonies of this addition to the island were observed which contained specimens of the *Acari*, *Sphaerolaelaps holothyroides* and *Trachyuropoda bostocki*. *Beckia albina* also occurred with this ant.

Formica fusca, L.—Plentiful. Large colonies occurred under stones which contained many deälated ♀ ♀. A number of microgynes were present, some of them being deälated, whilst four or five possessed some wings, and wing-stumps, evidently from last year. Eggs were found in all the nests, and larvæ, and ☿ and sex cocoons in some. *Drusilla canaliculata*, a Chalcid, a spider which Dr. Jackson is unable to name at present, and a number of a *Laelaps* sp. ? (near to *L. myrmophilus*, Mich.) were found in these nests. The most interesting discovery, however, was a large number of the larvæ, all sizes, of *Atemeles emarginatus*, which were always situated on the ants' brood. As soon as the stone over a nest was lifted up, the first thing the ants did was to seize these interesting beetle larvæ and endeavour to carry them down the galleries into safety, and considerable celerity was required to secure any. The perfect insect is recorded by Joy and

Tomlin [*Ent. Mo. Mag.*, xliii., 28 (1907)], though they do not mention its host, and judging from the number of its larvæ observed in many parts of the island, it would seem to be abundant.

Formica fusca var. *fusco-rufibarbis*, Forel.—This variety was observed on the west coast only, it is probably the *F. cunicularia* referred to by F. Smith.

It is evident from the above notes that both the ants of this island and also the other inhabitants of their nests would well repay further study.

"A Swiss Eldorado" in 1913.

By ROSA E. PAGE, B.A.

Mr. Muschamp has, in the preceding number, given one aspect of his Eldorado; I am now going, in response to his request, to show the reverse side of the picture. I must, however, apologise to the reader for a second doleful article in one year, my excuse being that our late esteemed and revered Editor always considered that the lean years should be chronicled as well as the fat ones.

On July 27th, five nets were at work on the Stäfa marshes; *Coenonympha tiphon* was nearly over, but enough good specimens were obtainable if worked; their habits recalled to us the Spanish *C. iphioides*, *C. tiphon*, however, being much more conspicuous and easy to capture. *Aphantopus hyperantus* type, with many ab. *caeca* (these being especially numerous this year) was still plentiful and fresh, one remarkable specimen having the ground colour of the left hindwing underside creamy in lieu of the usual coloration, whilst the left forewing is devoid of all spotting, and has some of the membrane of the apical portion missing, an accident having evidently occurred during the pupal period. A few nice ♀ s of *Melitaea dictynna* and *Lycaena alcon* completed our short list of insects taken, the year being an exceptionally bad one here as everywhere else in Switzerland. In the afternoon a thunderstorm broke and rain continued during the rest of the day. The following morning looking much too unpromising for collecting, we visited Zürich; but, provokingly, out came the sun, of course too late for any alteration of our plans.

The 29th being fine, we walked, with Mr. Muschamp as our guide, from Glarus through shady woods up to the Children's Summer School, where a spring invites one to an *alfresco* lunch, with which, however, one must provide one's self, the school not possessing a superfluity, even of bread. Continuing through wood, we at last came out some hundred feet above a little gem of a lake, surrounded by a succession of grand and rugged slopes, every tint and line of which it reflected in its placid surface. This we skirted, taking the right hand side, the road running between the precipitous slopes and the flowery banks of the Klönthalersee to the Klönthal Hotel. The remarkable dearth of insects the whole way up was, I fear, a bad omen, nothing at all appearing but a few *Erebia stygne* in very fair condition, flying on the herbage at the base of the rocks beside the lake.

The next day we continued our ascent through the Rossmatterthal to the Club Hut, by the beautiful path described by Mr. Muschamp. Just above the châlets of Werben a few *Parnassius apollo* and *P. delius* were taken, the latter flying wildly in a gully beside the stream, while on the slopes immediately above were a good number of the former, the remarkable fact being the reversal of the two species with regard to altitude; among the few taken were, of course, no hybrids. Higher up, long sweeps of flowery Alp stretch from the rocky precipices aloft to the valley below, forming perfect collecting ground in ordinary seasons; the only insects which had been able to survive the continual rains of the preceding weeks were a few *Albulina pheretes*, *Aricia eumedon*, *Erebia stygne*, and an odd *Cupido minima*, with one *Melitaea cynthia* (a cripple), flying just below the Club Hut. Mr. Muschamp, who knows these valleys intimately, was astounded at the poverty of insect life, but did his best (though ineffectually) to console us with accounts of what *should* be there and in what numbers they *ought* to be. We reached the Club Hut without rain, but during the night it poured in a most business-like way, and the morning broke showing the valley beneath us full of mist. Collecting being out of the question, we clambered over the rocks above the Club Hut and on to the glacier, to find the crevasses all covered up with fresh snow, through which we trudged for a good distance, examining hundreds of lace-winged flies, beetles of several species, craneflies, and other Diptera resembling houseflies, all of which lay numbed and frozen either on the surface of the snow or in slight indentations, these no doubt caused by the absorption and radiation of heat by the insects owing to their darker coloration. On the slopes above the Club Hut, where the sun shone for a short time, were a few *Melitaea cynthia*, the ♀ s evidently just out, and sunning themselves; also one or two *Erebia lappona*, chipped by the hail. Everything being so hopeless, we descended in the afternoon through the mists to the Klönthal Hotel, where we passed the next few days of fine weather, hoping that the insects would be emerging to enjoy it too.

Our next visit to the Club Hut was on August 4th, the weather during the morning being delightful. In the lower wooded slopes of the Rossmatterthal *Erebia ligea* and *E. manto* were flying fairly plentifully, *P. apollo* was in numbers as before above Werben; solitary specimens of *Argynnis aglaia*, *Brenthis amathusia*, *B. pales*, *Cyaniris semiargus*, with a ♀ *Albulina pheretes* in shreds, were the only butterflies on the splendid ground between Werben and the Club Hut. A subtle change in the weather heralded a heavy hailstorm, which we only just escaped by scrambling up to the Hut in time, and rain continued all night, as on our last visit. The next two days were spent in the Club Hut, waiting for the rain to stop. Mr. Muschamp has hinted at some of the delights of a stay here, but a description of our attempts to pass the time during the unceasing rain and hail of these two days, not above the clouds, but among them, the Hut supplying nothing in the nature of literature or of writing materials, would make entertaining reading. We managed to get down to the Hotel Klönthal again on the afternoon of the 6th, and then followed a period of rain lasting till the 15th, during which the hotel gradually emptied, Mr. Page and myself being the only two left to listen to the landlord's wailings. Telephonic communication with Stäfa elicited the fact that the weather was as bad all over Switzerland, and that the season was the worst for the last 20 years, worse even than in 1912; people were all coming down from the high Alps and the hotels in the plains were full to overflowing: the Jungfrau had been wrapped in mist for six weeks.

On the 17th we were roused at 3.30 a.m. by our vigilant friend, with the news that it was a grand morning; by 4.30 we were off for our third attempt, reaching the Club Hut at 9.0, the sun shining brilliantly, but the valley being not yet reached by its rays. How we enjoyed our walk in the clear cold air, the herbage covered with hoar frost, the freshly fallen snow on the peaks glittering as the sun lit up point after point, the forms of the mountains being outlined by the shadows thrown on the valley slopes. A few Gnophids were resting on the rocks as we passed them on the ascent. As soon as the sun had had time to warm the ground and disperse the frosts, we commenced to search the forget-me-not besprinkled slopes to the right of the Club Hut, but not an insect appeared. We sat down in blank despair, words failing us to express our feelings at the havoc worked by the continual rains; we even gave up trying to console each other by drawing attention to the magnificent views all around us.

About 11 a.m. we wandered over to the moraine, where a stream from the glacier comes down between deep stony banks of débris, and here we were delighted to see an *Erebia glacialis* (type) airily skimming along a yard or two above the stone-bestrewn ridge. Further search was rewarded by our seeing about a score in varying condition, together with a few *E. gorge*. On returning to the Hut we found Mr. Muschamp's son George had taken a var. *alecto* on screes to the left of the Club Hut (going up). Both he and Mr. Muschamp worked the same screes in the afternoon, but found no more, although they saw a few worn *Melitaea cynthia*.

We slept again at the Hut, and were aroused about 5 a.m. by the blithe carolling of the maid outside the "Damen-Salon" window, to find another brilliant day. As soon as the sun reached the Hut we commenced the descent, working the slopes *en route*. Near the moraine *Anthrocera* (*Zygaena*) *exulans* was fairly plentiful on its food-plant, a species of trefoil, and on Alpine rose, but there was no sign of *Latiorina orbitulus*, although Mr. Muschamp had taken one on the previous day. Few butterflies were seen until we got to the steep grassy slopes leading down to the river, where *Anthrocera* (*Zygaena*) *ochsenheimeri* were plentiful on flower-heads, with an occasional *E. tyndarus* and a few *E. pharte*. But as one descended, half glissading on the slippery grass, and revelling in the "grilling" due to the return of the sun-god in all his power, after weeks of bad weather, the soft flutter of Erebias all around one (chiefly *E. manto*, most of which had just emerged), and the joy of being once more on the warpath almost made one forget past dolors, and one could easily imagine what Eldorado must be like in more favourable times.

After a frugal lunch at Käsern, the weather suddenly became dull, the air softer, and very little was done in the lower woods; the only *Dryas paphia* seen this year, a small and crippled specimen, was resting on the herbage by the roadside near the Klönthal Hotel. Next day, rain and thunder visited the valley once more and the weather had evidently broken up for good, so we gave up further attempts at collecting and left Klönthal, hoping to revisit it at some future date, under better auspices.

> "These three, of which my tale is specially,
> Whan that they saw they might not come thereby,
> Within their brests ful soreweful were their gostes.
> But home they gon, they mighte not sojourne,
> The day was come, that homeward must they turne."
>
> (With apologies to Chaucer.)

Further note on Dr. Verity's Linnean suggestions.

By G. T. BETHUNE-BAKER, F.L.S., F.Z.S., F.E.S.

Since writing my criticism on Dr. Verity's paper on the Linnean collection I have been able to refer to *all* the references given in the case of *Papilio podalirius*, and I find in the "*Mus. Ludovicae Ul.*," that Linnæus gives on p. 208 (where he describes the species for the first time), a brief diagnosis of it, and also an extended description; in the former he describes it thus, "podalirius 27 alis caudatis subconcoloribus *flavescentibus*," in the latter he says "supra *flavae*."

This description is decisive in being inapplicable to *lotteri*, no accurate author could call *lotteri* yellowish, to say nothing of yellow, it is greyish, and the contrast in colour between it and typical *podalirius* is very marked.

Dr. Verity says that entomologists do not seem to have in all cases noted in which of Linnæus's works the first description appeared. To this I would say the first *description* is not necessary for the validity of the name, a figure or reference to a figure is recognised by the "Code" as sufficient for validity; but further, it seems to me that the doctor himself cannot have referred to this description, as if he had he could not have fitted it into a specimen of *lotteri*, for no one *could* call *lotteri* yellow, whereas ordinary *podalirius* would always be called yellowish or yellow. There is another point I think he ought to have referred to, but which he significantly omitted, *viz.*, the fact that in the work just quoted, Linnæus, with all the facts before him ranks *sinon* as a synonym of *podalirius*.

Now let me touch another point still—Duponchel's *feisthameli*—that author described his species in his "*Hist. Nat. Lep.*," p. 7, *et. seq.*, and he here comes in as first reviser, saying that *feisthameli* is not *podalirius*, but that it is a distinct species, whilst Dr. Verity himself emphasises this very thing. This fact of itself should have prevented him going back from the first reference to figures by Linnæus and attempting to upset a name that had been in use for 150 years, and the "Code" would certainly rule the action as "ultra vires."

Let us, however, go back to the figures referred to by Linnæus and look at that contained in Rösel's work. This was evidently well-known to that learned author. The figures there given are quite good ones of typical central European *podalirius* and they are as Linnæus describes them yellow, this "indication" given in the 10th ed. of the "*Systema Naturae*" cannot be ignored; and again with this before him (and as I suppose Dr. Verity would say with specimens before him as well) Poda's figure puts in an appearance which was recognised by Linnæus as his *podalirius*, and the name given by Poda, *viz.*, *sinon*, was sunk without note or comment to his earlier name.

I cannot possibly accept Dr. Verity's statement that Linnæus considered the first mention of the name in 1758 as null, for the whole evidence that I have now brought forward is absolutely in the contrary direction, and proves that he maintained his name for the Central European insect, even to the extent of sinking his friend's name to his own previous one. I hold, therefore, that *podalirius* must stand as hithertofore, and would conclude with the hope that Dr. Verity's suggestions may be referred to the National Nomenclature Sub-committee.

Notes on Erebia gavarniensis, n.sp., and some forms of Erebia manto.

By B. C. S. WARREN, F.E.S.

Flying on the Grammont, on the 16th of last August, with seven other species of *Erebia*, I came across *E. manto* in profusion. A week later, on the Rochers de Naye, I found it again in great numbers. From these two localities I obtained a fine and varied series. In all 38 ♂s and 30 ♀s.

A very superficial examination showed that slightly more than half of these were typical *E. manto*. While endeavouring to separate the various forms I found in this series, I referred to Mr. Wheeler's "*Butts. of Switz.*" Here there are three forms mentioned: the var. *pyrrhula*, Frey., and abs. *bubastis*, Meissner, and *caecilia*, Hübn.

With the first two I was not concerned, as none of my specimens approached either, and of the ab. *caecilia* I had four specimens which I referred to it without hesitation. But there were many other forms in my series, so I turned to Mr. Lowe's interesting article in the *Entomologist* (vol. xlv., p. 144).

He here mentions four forms, but is principally concerned with two—the vars. *vogesiaca*, Christ, and *trajanus*, Hormuzaki. The former Mr. Lowe states, according to Staudinger, to be a "form of the ♀ without basal spots on the underside hindwing, otherwise as in the type," but adds that Rühl gives a fuller description, noting it as being "larger than the type, with the markings of the forewings yellow and broader, and seldom containing black spots." These descriptions were not very satisfactory, but as I had not any specimens which seemed to merit the name *vogesiaca* under either description, I left the matter alone.

The second form which Mr. Lowe found commonly at Champéry, was a form of ♀ entirely without markings on the *underside* (the "underside" being in italics one may conclude the upperside was typical), which he first thought an undescribed variety, but then refers to var. *trajanus*, Hormuz. Here, again, Staudinger's description leaves considerable doubt as to what *trajanus* might be. There are none among my specimens which would answer to the description, "underside entirely without markings, upperside normal"; but I have four ♀s in which, on the underside of the hindwings, the median band is only represented by a few small isolated spots, the basal spots scarcely visible, being suffused by the ground colour, the forewings underside typical, and the markings of the upperside as in the type, but slightly reduced. These might possibly come under the name *trajanus*, according to Staudinger, but if they did Mr. Lowe's specimens could not. Again, I have a few fine ♂s with the median row of spots on the underside of the hindwings reduced to three or four tiny spots, scarcely visible, all the other markings are present as in the type, but greatly reduced in size; these, too, *might* possibly be a ♂ form of the var. *trajanus* (but again it was only "possibly"). So far, the confusion only seemed to be getting worse. Of the remaining two forms mentioned by Mr. Lowe, I was not concerned with the ab. *pyrrhula*, having nothing approaching it among my captures, and about the var. *caecilia*, one did not think there could be any uncertainty. I have four specimens (as already noted) two ♂ s and two ♀ s, which I was sure were to be referred to this var.

One ♂ is entirely without the rust-coloured bands and black eyespots, both on the upper- and underside. The other ♂ and two ♀ s are nearly so. I was putting these specimens on one side, with a feeling of relief, when another difficulty arose.

I have in my collection a series of the beautiful *Erebia* from the Pyrenees, which in all recent publications is mentioned as the var. *caecilia* of *E. manto.* On placing my specimens from the Grammont beside those from the Pyrenees, it was at once apparent that both forms could not possibly be placed under the same name. The Swiss specimens were exactly like the type, but without the spots and bands; *i.e.*, the *whole* of the underside of the ♂ is suffused with the beautiful mahogany colour which is so conspicuous in the type ♂. In the larger Pyrenean race there is *no trace* of this whatever. My Pyrenean specimens, too, were absolutely fresh when caught, and this makes the want of the colouring all the more striking. A further careful comparison of the Pyrenean specimens with typical *manto*, and of the neuration of both, left little or no doubt in my mind that I had here two separate species.

There was only one thing left to do. I wrote to Mr. Wheeler and asked him if he could get, and send me, the original descriptions of the vars. *caecilia*, Hübn., *trajanus*, Hormuzaki, and *pyrrhula*, Frey, (his diagnosis of the latter, in his *Butts. of Switz.*, leaving some uncertainty as to how closely this var. approached var. *caecilia*). This troublesome job, in spite of his many engagements, he most kindly did; and also sent me some most useful extracts from papers by Dr. Chapman and Mr. Elwes (*Trans. Ent. Soc. Lond.*, 1898) bearing on this subject.

To take the var. *caecilia* first, the following is a translation of the original description, which is given under the heading *Pap. pyrrha*, *manto*, Esp.:—" *Caecilia*, Hubn. (pl. xlvi., figs. 213, 214).—One finds examples of this species in which the macular bands are partially or entirely unicolorous. I have figured one of these varieties, and a less pronounced one is *atratus*, Esp."

Mr. Wheeler tells me that the figure is nearly black on the upperside, with rather chequered fringes, and that the underside is not so black, and with a small patch of reddish on the forewings. Fringes yellowish-brown.

Though Hübner's is not a very minute description, it is perfectly obvious that the central European form is the one which he intended to name. He actually says it inhabits the "German Alps," and the statement, "partially or entirely," in referring to the bands and spots, shows that he was not even thinking about the Pyrenean race. The Pyrenean race, therefore, has no claim to the name *caecilia* or to any connection with it, and is apparently left in want of a name.

I find that both Dr. Chapman and Mr. Elwes, dealt with this race fifteen years ago, yet, during the last few years, it has been (whenever mentioned in the magazine articles) spoken of as var. *caecilia*. The following extract is from Mr. Elwes' paper.

"ab. *caecilia*, Hübn., 213-14, Text, p. 35. Alps.
(*Supra fere vel rarius tota nigra.*)
var. constans, *caecilia*, Dup., i., 49, 6, 7. Pyrenees.
(♂ *et* ♀ *supra tota nigra*, ♀ *infra minus fusca notata.*)"

He also states (p. 171), that he is *not* giving it a new name, not being sure whether *manto* does not exist in the Pyrenees. Thus, while suggesting separation, Mr. Elwes seems to class this race as a Pyrenean form of *caecilia*, while in his definition he does not even mention the extraordinary difference of colour in the ♂ underside. Seitz has made a curious mistake in applying the name *constans*, Elwes, to a Pyrenean form of *manto*, since the latter gave no name to it at all, but merely stated that while *caecilia* is an aberration in the Alps, it is a constant variety in the Pyrenees.

Dr. Chapman, without naming it, separated this race from *manto*, on the strength of the genitalia, and though this is not always sufficient proof by itself (as was shown not so long ago by certain species of *Melitaea*), in this case there are so many other constant characteristics, practically sufficient in themselves to give it specific rank, that one may take it as conclusive.

The following description of this Pyrenean *Erebia*, is made from 28 specimens in my collection; sixteen ♂ s and twelve ♀ s, all taken in the Val d'Ossue, Gavarnie (where it is exceedingly abundant), on July 20th and 22nd, 1911.

♂.—Slightly larger than *E. manto*, varying from 46mm. to 48mm. (*manto* 40mm. to 44mm.).

Upperside: Ground colour velvety black, *entirely* without markings.

Underside: Same black ground colour as the upperside, but without the velvety gloss. *No trace whatever* of the mahogany suffusion, (which covers the whole surface of the underside of the wings in *manto*), giving it the dull blackish-brown appearance, which is so striking a characteristic in this species. Occasionally a *very* small rust-coloured spot at the apex of the forewings. Only two out of the sixteen ♂ s in my possession show this, and in these it is confined to the underside. The fringes of both fore- and hindwings very much less conspicuous than in *manto*, owing to their being of the same shade as the ground colour of the wings.

♀.—Very constant in size, and larger than *manto*: 50mm. (*manto* ♀ varying from 42mm. to 48mm.)

Upperside: Usually entirely black, without bands or spots, as in the ♂; but occasionally with two small black apical eye-spots present, the spots in these instances are somewhat smaller than the corresponding ones in *manto*. The ground colour on the whole darker.

Underside: Frequently completely without markings, though never so unicolorous as in the ♂; more usually with one or two *very* small yellow spots on the hindwings; no basal spots; on the forewings a square rust-coloured spot at the apex; no eye-spots. The whole tone of the ground colour much duller than in *manto*.

In the neuration the following are the principal differences:—

Pyrenean race, forewings: All the nervures slightly more curved than in *manto*. Discoidal cell a little more than half the length of the wing, the connecting nervule at the end of the cell, between nervures 4 and 6, nearly straight, except for a small sharp angle where nervure 5 joins it. Nervures 6 and 8 springing from the costal angle of the discoidal cell, but *not* touching at this point. Cell one-third as broad as the length. In *manto* the discoidal cell is just half the length of the wing, the connecting nervule between nervures 4 and 6 curved; convex towards the base of the wing, the junction of nervure 5 causing no angle. Nervures 6 and 8 joined at their base, springing from the same spot in the costal angle of the discoidal cell. Cell a little more than one-third as broad as the length.

Hindwing: Discoidal cell much less sharply angled than in *manto*. Nervures 6 and 7 rising close together, and ending further apart (at the margin of the wing) than in *manto*. Nervure 5 consequently rises much further from 6 in the Pyrenean race. Discoidal cell slightly narrower than half its length, while in *manto* it is a little broader than half its length.

The various characteristics of size, markings, tone of ground colour, are all exceedingly constant, and if taken with the structural ones, *viz.*, the neuration and Dr. Chapman's verdict on the genitalia, can leave no possible doubt that this Pyrenean *Erebia* is a distinct species. As *constans*, Seitz (not Elwes), would have to be taken as the name of a dark Pyrenean form of *manto*, if such were found to exist, the Pyrenean species is still unnamed, and I propose the name *gavarniensis*, n. sp., for it.

We now come to the var. *trajanus*, Hormuzaki. The following is a slightly abbreviated translation of the original description.

"Var. ♀ *trajanus*, Hormuz.—The characteristic marking which separates our variety from the type (*manto*) lies in the ground colour of the underside.

"Forewings a light red-brown, dusted with yellow-grey towards the apex and costa . . . .

"Hindwings light greenish-grey, quite different from the ground colour of the forewings, resembling the colouring of the underside hindwing of *E. arete*. This colour is thickly spread over almost the whole surface of the wings, and there is a pronounced covering of greenish-gray hairs near the base . . . . All the spots are distinctly bordered, in both specimens, not with reddish-yellow, as in the type, but with pale whitish-yellow."

This description (which was made from two ♀ s taken in Bukovina, on chalk) shows that none of Mr. Lowe's specimens, or mine, are in any way connected with the var. *trajanus*, which must be a magnificent variety, and is probably a purely Eastern one. The reference to the colour which surrounds the spots on the underside of the hindwings, at once excludes Mr. Lowe's specimens, as the ground colour does mine, and probably his also; for he makes no mention of this being unusual. One cannot, therefore, do better than to refer Mr. Lowe's specimens to the name he suggested for them in the beginning, var. *indigens*, which he described as "a ♀ form, underside entirely without markings, upperside as in the type." My four ♀ s which (as already noted) have the median band on the underside of the hindwings only represented by a few small isolated spots, the basal ones scarcely visible, being suffused by the ground colour, the forewings underside typical, and all markings of the upperside similar to the type, but slightly reduced, must be considered a transition to var. *indigens*, Lowe.

The four ♂ s, already described (see commencement), which I thought might belong to the same form as the ♀ s, are excluded from this, since placing the latter as transitions to var. *indigens*. Failing to find any more concise name for them, I must regard them as a transition to var. *caecilia*.

There is still another fine ab. of the ♀ which has not, so far, been mentioned; in this the band on the upperside having completely disappeared, leaves the black eye-spots without any rust-coloured surroundings. These spots are *double* the normal size on both fore- and hindwings. The underside is quite typical. I have two specimens of it, one from the Grammont, and one from the Rochers de Naye. No ♂ of this form has, as yet, come under my notice; but I have remarked that among the ♂ s, as soon as any loss of the bands occurs on the upperside, a similar reduction takes place on the underside. It is therefore probable that this ab. will only be found among the ♀ s. Up to the present it does not seem to have been noticed, so I suggest the name of ab. *punctata* n. ab., for it.

Aenigmatias blattoides, Meinert, captured in Scotland.

By HORACE DONISTHORPE, F.Z.S., F.E.S.

On July 21st I captured a specimen of this very rare aberrant Phorid in a nest of *Formica fusca*, situated under a stone near Forest Lodge at Nethy Bridge, in Inverness-shire. It was observed running about in the galleries of the nest, and was very rapid in its movements. It is apterous and superficially very like a tiny *Blatta* in appearance. When placed in a tube the anal segments of the insect's body were observed to be rapidly exserted and retracted. On sending it to Mr. J. E. Collin he returned it to me as the above species.

Aenigmatias blattoides was first taken by Meinert[1] in Denmark, in a nest of *Formica fusca*. He took two specimens near Copenhagen, the first is in the University Museum there, the other appears to have been lost. Wasmann[2] next bred a specimen in one of his observation nests of *Formica rufibarbis* in 1902. In 1906 he found a specimen in a nest of *F. rufibarbis* under a stone in a garden at Luxemburg. Under the same stone *Lasius niger* was present and it may be mentioned that in the first case he had given *L. niger* cocoons to the *rufibarbis*. His third example was found in 1905 in the same garden, this time in a pure *rufibarbis* nest. In 1908 he observed two freshly hatched specimens in an observation nest of *F. exsecta*, to which he had given a number of *F. fusca* cocoons. It seems most probable that the true host of the fly is *F. fusca* (and its sub-species *F. rufibarbis*), the Dipteron emerging from the *fusca* cocoons. As the parasite is so seldom found, it is most likely as Wasmann remarks, that when hatched it leaves the nest and only re-enters to lay the eggs. Dahl believes that the ♂ of *Aenigmatias* is *Platyphora lubbocki*, Verrall[3], and, however this may be, it is noteworthy that all the specimens found of the former are ♀ ♀ and of the latter ♂ ♂. I have been looking for *Platyphora* for 20 years, and at last, this year, I bred two specimens in my *F.*

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[1] *Ent. Meddel.*, ii., pp. 212-226 (1890).

[2] *Biolog. Central.*, xxviii., pp. 728-730 (1908).

[3] *Linn. Soc. Journ. Zool.*, xiii., 260 (1878).

sanguinea nest on July 11th and 26th. As I have had this nest for four years, it is almost certain that the flies were not bred from the *sanguinea* pupæ, but from *fusca* cocoons, of which I have given large numbers to the "slave-makers" for slaves and food. All Wasmann's specimens were found in July, and both my *Platyphora* and *Aenigmatias* occurred in the same month.

Collecting Rhopalocera in Spain, 1913.

By E. B. ASHBY, F.E.S.

I left Vernet-les-Bains on the afternoon of June 13th, and after a night's travel arrived the following morning at the Estacion Francia, Barcelona, about 7.50. After breakfast I took my way by tram to the Plaza Catalonia, where another tram must be taken to the Funicular Railway Station, whence commences the ascent of Mount Tibidabo, the whole journey taking about an hour and a quarter.

The beauty of the scene when one arrives at the top is superb; below is spread out the large city of Barcelona, away beyond it is the coast-line and the blue waters of the Mediterranean, and to the west the undulating landscape of Catalonia. There is plenty of good collecting ground along the crest of this mountain towards the left, and the sun was shining brightly in a perfect sky. I found *Melanargia lachesis* just emerging and secured a few in splendid condition. *Colias edusa* was well on the wing, not as we usually see it on our English seaboard in twos and threes, nor even as generally seen in Switzerland and the Basses Alpes, but really very numerous and in good order. *Papilio machaon* was evidently still emerging, as I took a dozen perfect specimens along the flatter portion towards the left, without any difficulty. *Pyrameis cardui* was perfectly fresh, evidently they were just coming out, as also was *Melitaea didyma*. *Nordmannia* (*Thecla*) *ilicis* and *Pontia daplidice* were about equally numerous, and I secured a couple of *Anthocharis belia*. Here I was very pleased to meet with *Epinephele pasiphaë* for the first time, and as it was in good order I was able to take a nice series. There are two very good restaurants near the station on Mt. Tibidabo, so that after lunch I was able to go on collecting again, and about four o'clock I returned to Barcelona, quite pleased with a most successful day's collecting.

The next day was spent in travelling to Madrid *via* Réus, Caspe and Saragossa, and I found that travelling in Spain was sufficiently comfortable, and that excellently cooked meals were served in the restaurant cars. To my regret time did not permit of my seeing Saragossa and Madrid properly, as I was anxious to get to the next collecting ground, La Granja, as early as possible. After a three hours' train journey from Madrid, passing over the Sierra Guadarama, I arrived at Segovia on the morning of June 16th. A further journey of seven miles in an omnibus brought me, about 12.30 p.m., to the Hotel Europeo, at La Granja. The trains do not travel very fast in Spain, and from the train between Madrid and Segovia I had no trouble in identifying many of the large numbers of butterflies I saw along the sides of the railway, especially at the lower levels. One would like to find a good place to stay at readily accessible to this portion of the journey.

La Granja, the Grange, originally a monkish farmhouse, was converted by the Bourbon king, Philip V., into a residence rivalling the glittering creation of Versailles, and surrounded as it is by lovely woods, which extend for leagues in every direction, by gardens, lakes and streams, the Palace of San Ildefonso, in the month of flowers, is a paradise and a miracle combined. I found the Hotel Europeo quite comfortable, and as the King and Queen of Spain were staying at the Royal Palace of La Granja at the time, full of officers of the Spanish garrison.

After "merienda" (lunch) I went out by the Puerta del Sol towards the hills, but did not find much except some very fine *Aporia crataegi*, which are much larger than those caught in Switzerland or France. A thunderstorm prevented much being done, but I subsequently captured a very good specimen of *Macrothylacia rubi*, which dashed straight at my face. The next day, June 17th, I worked the hills above La Granja to little purpose, except that I was fortunate enough to get several specimens of *Erebia evias*, and three large beetles which I have not as yet identified. A few *Colias edusa* were flying on the lower slopes, together with several var. *helice*. In the afternoon, after returning to the level of La Granja, and working in the direction of the well known farm, I found insects abundant, especially *Melitaea aurinia* of the form var. *iberica*, Obthr., in good condition. Among other species were *Plebeius argus* (*aegon*), *Argynnis aglaia*, *A. niobe*, *Melanargia lachesis* (one, which seemed to have just emerged), *Thais rumina* (slightly worn), and a few commoner insects.

On June 18th my collecting was much hindered by cloud and rain, but I "sat it out," and during the bright intervals got some good things. *Colias edusa*, *Pontia daplidice*, and about a dozen *Dryas pandora* absolutely fresh. This last species was seen first on this date, three days earlier than I calculated before I left England that I should take it. They are really extremely abundant at La Granja, and though difficult to catch in the early morning when settled on the ground under the ferns, they are very easily swept off the thistles on which they settle during the sunshine later in the day. After getting wet through during this long day, spent on both sides of the stream between La Granja and the farm, I returned to the hotel rather knocked up.

The following day, June 19th, the sun came out in all its strength in a cloudless sky, conditions which continued until I left La Granja, at the end of the week. I spent the day on the left side of the Segovia road, past the polo ground, in a ravine down which a stream runs, uniting with another stream by the bridge under the main road. Leaving La Granja by the Puerta del Segovia, in half an hour I was on the ground. I took *Lampides boeticus* for the first time, but it was somewhat worn. *Melanargia lachesis* and *M. japygia* var. *cleanthe*, were on the banks above the stream in small numbers. *Dryas pandora* was abundant, as was *Argynnis aglaia*, and a few *A. niobe* and one *Pontia daplidice* turned up.

June 20th I intended to spend in the same place, but by half past twelve I was compelled to give up on account of the heat and return to the hotel and rest for the remainder of the day. My captures were the same species as on the previous day with several more examples of *L. boeticus*.

The next day I made an early start and worked on both sides of the stream leading to the farm. Many *Dryas pandora* were obtained and a female of *Thais rumina*, in splendid condition, was captured. My special quest on this day was *Laeosopis* (*Thecla*) *roboris* in its special haunt, the right side of the road leading to the farm, but without success. At the end of the afternoon of this day I left La Granja to return to Segovia. During the drive I noted hundreds of *Leucoma salicis* flying around the numerous poplar trees along the roadside, apparently quite fresh. Before starting on my journey I took the opportunity of visiting the Cathedral of Segovia with its beautiful paintings, the fine Roman aqueduct and the Alcazar. After travelling all night I arrived in Guéthary, France, about noon the next day. Altogether my trip in France and Spain of this year was a very pleasant and successful one, and in conclusion, with reference to the various statements which have appeared both in this magazine and elsewhere, I should like to place myself on the side of those who consider that the comparative dearth of insects in England, France and Switzerland, in the early part of the year at any rate, was due, not to over-collecting, but to the excessive amount of rain last summer and in the early spring of this year.

Tyrol in 1913.

By DOUGLAS H. PEARSON, F.E.S.

Having no personal knowledge of the butterflies of Tyrol, we determined this year to go and make their acquaintance, and on June 26th left London for Innsbruck *via* Boulogne and Laon.

The Brenner Pass was to be worked from Innsbruck, and many good things were to be taken from the district; but we arrived in a steady rain, which continued for three days with variations from raining to pouring, and during that time the net was not unpacked. Feeling suicidal, we took train to Bozen and in the afternoon were rewarded by glorious sunshine and the first sight of butterflies. The next morning (June 30th) we set out for the Eggenthal, walking down the far side of the river, and picking up *Coenonympha arcania*, *Brenthis daphne*, *Melitaea athalia*, etc., on the way. Soon after entering the Thal *Celastrina argiolus* was taken, and a nice little series of this, including a few ♀ ♀ in fresh condition, was captured during the week. A very few *Scolitantides orion* were also netted, but not quite fresh, and three *Neptis lucilla*, which were new to me. These last have a floating flight and are not difficult to catch if they condescend to come within reach, but they spend most of their time over the tops of the willows in un-get-at-able places. In contrast to Innsbruck the road was nearly two inches deep in dust, with deep ruts, and when stirred up by the frequent timber lorries, was very unpleasant. The black cicadas on the telegraph posts made more noise than a flock of starlings, but they were the only insects that could be said to be plentiful.

On July 1st we took the interesting wire railway from Kohlern and walked up to Titschen, but the only insects of interest were *Erebia euryale* var. *ocellaris*, which we found in a clearing of the wood. This is so unlike the ordinary forms of *E. euryale* that it might easily be taken for another species, the red-brown band being reduced to tiny dots and the ground colour being nearly black.

The next day we took train to the Mendel Pass, with plenty of boxes for *Erebia nerine*, which were supposed to be sitting on the rocks waiting for us. On the top of the Pass—a terribly civilized place—*E. euryale* was fairly common, but all with strongly marked bands, and no var. *ocellaris* were seen, whereas at about the same elevation at Kohlern none of the type were met with. The rocks on the way down were most carefully worked for *E. nerine*, but not a sign of it was seen, and insects generally were very scarce with the exception of *Pararge achine*, which was fairly common in some of the roadways into the woods, while an odd *Polyommatus amanda*, *Erebia ceto*, and *Euvanessa antiopa* were picked up.

One of the chief attractions to Bozen was *Libythea celtis*, which Mr. Lowe found swarming in the Sarnthal and Eggenthal in 1901, but two visits to the Eggenthal and one to the Sarnthal failed to turn up a single specimen. Hearing that there were a number of *Celtis* trees behind the Hotel Austria, at Gries, we took the tram and walked through the pretty gardens attached to the hotel, where cactus were growing wild on the mountain side, and a nice collection of foreign cacti were doing well in a rocky part of the garden. *Celtis* trees there were in plenty, but no *L. celtis*, though on returning from a walk towards the Sarnthal a solitary specimen was seen in the street and missed as it flew over a high wall. This was the only specimen seen until one was captured in the Eggenthal on July 5th. It surely could not have been over, but unless Mr. Lowe cleared out the stock it is strange that it should not have turned up in any of the various localities worked.* The Sarnthal was even deeper in dust than the Eggenthal, and also hotter if possible, but butterflies were by no means plentiful, and we only managed to take four *S. orion*, two *Everes argiades*, some *Papilio podalirius* with especially long tails, and odd specimens of *Polyommatus hylas* and *C. argiolus*.

On July 5th we took the diligence to Karersee, and by walking ahead managed to take the aforesaid solitary *L. celtis*, two *Polyommatus meleager*, several *P. amanda*, very bright and with strongly marked borders, and one each of *Limenitis camilla* and *L. sibylla*, which were taken at one stroke of the net. One *Limenitis populi*—the only one seen—was also taken in the Thal, and a fair number of *Brenthis daphne*.

Karersee, with its comfortable hotel, seemed an excellent spot for butterflies, but the weather turned cold and wet, and practically nothing was taken either here or on the two days' drive down to Cortina, through the splendid scenery of the "Dolomite Road." We stayed at Cortina from July 9th to 16th, but insects were exceedingly scarce, and with the exception of some more nice forms of *E. euryale* var. *ocellaris*, practically nothing was taken. We moved up to Tre Croci in a deluge of rain, and the next day walked up Cristallo, until the newly fallen snow became too deep and made heavy going. The following day we walked up to the Pfalzgau Hut, and within ten minutes from leaving the hotel had the luck to meet with *Erebia pharte*, flying freely in an open space on the hillside. No time was lost in bagging a nice series, but directly the sun went in they disappeared as if by magic, and evidently got well down into the herbage as none could be seen sitting on the grass, and in the afternoon not a single specimen could be kicked up. We drove down to Toblach and took train to Innsbruck, where it was still raining and where the hay still lay sodden and brown in the meadows.

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* Certainly not "cleared out," for in the spring of 1912 Mr. Sich reported it in absolute abundance on the roadsides south of Bozen. They were of course hybernated specimens.—H.J.T.

With pleasant memories of Weesen we broke the journey there, and tried the marsh for a belated *Lycaena arcas*, *L. euphemus*, or *C. tiphon*, but not a sign of any of them could be seen, though we took a few quite freshly emerged *G. rhamni*.

A long walk to the top of Speer produced nothing better than *Erebia ligea*, and we took the train home wondering what had become of the butterflies, as during all our trip even the commonest insects were distinctly scarce, and nothing could be said to have swarmed.

As a set off to the lack of insects the flowers were beautiful, and over twenty species were found which we had not seen in Switzerland, including *Rhododendron chamaecistus*, *Potentilla nitida*, *Dianthus monspessulanas*, *Aquilegia thalictrifolia*, *Primula minima*; *Saxifraga caesia*, etc. May 1914 give us better hunting!

SCIENTIFIC NOTES AND OBSERVATIONS.

GNOPHOS OBSCURARIA AND RABBIT-BURROWS.—I am wondering if Mr. Colthrup's remarks *re Gnophos obscuraria* and rabbit-burrows in the current number of the *Ent. Record* (page 250), covers a case of association that has hitherto escaped notice. I have frequently noticed the partiality of this species for *bare soil* in chalk districts, but the suggested restriction to rabbit-warrens is outside my experience. Possibly the habit is a local one and limited to the dark form alone.—A. BACOT (F.E.S.), 19, York Hill, Loughton.

With regard to Mr. Bacot's query *re G. obscuraria*, I may say that on a slope of the Downs at Eastbourne, where there are no rabbit-burrows, this insect rests on the bare soil, etc. (as indicated in my note on "Protective Resemblance" in the May, 1912, number of the *Entomologist's Record*, p. 125), but on other parts of the South Downs where there are rabbit-burrows, it rests in them. It is possible some may be found outside, but I have not done so.

The method employed by the New Forest collectors to get the insect (which I have worked well elsewhere) is to take a "swish" made of one or two long twigs, rattle them at the mouth of the burrow, and net the insects as they fly out.

After all, this habit of hiding away in dark places is not so unusual with moths as is generally supposed, and I feel pretty sure that those found on fences and tree trunks are in most cases the exceptions.

On the Crumbles, at Eastbourne, a large expanse of bare shingle with only a few wooden posts, *Xylophasia monoglypha* (*polydon*) sometimes swarms at sugar, yet if you examine these posts the next day you will be lucky if you find a single specimen of *X. monoglypha* at rest on them, yet they would harmonize very well with the old wood. Where do they go? I believe down in the shingle.

At the beginning of last July in a small outhouse in our garden, a specimen of *Mania maura* was found at rest, and day by day the number increased till one morning there were seventeen. The moths went out for their flight at night, and returned through five triangular openings at the top of the door, the base of the triangles being only three inches. Individual moths could be recognised by certain marks.

They continued to resort to the shed after I left London at the end of July for my holidays.—C. W. Colthrup, 141, East Dulwich Grove, S.E.

Latiorina orbitulus.—In his remarks on this species, p. 243 *ante*, Mr. Muschamp appears to have overlooked a few data bearing on its life-history to be found in *Trans. Ent. Soc. Lond.*, 1911, p. 148.—T. A. Chapman (M.D.), Betula, Reigate.

NOTES ON COLLECTING, Etc.

Aberration of Epinephele jurtina.—In the *Irish Naturalist* for April Mr. L. H. Bonaparte-Wyse records, among other things from Kerry taken last year, a remarkable aberration of *Epinephele jurtina* (*janira*). It was a female, "which has two black spots below the large apical eye-spot on the forewing. These spots are also reproduced on the underside." It was captured at the foot of Mangerton on July 16th, and on August 1st a very similar specimen was taken at Glenbeigh. He also records two specimens of a *Hydroecia* taken on Valentia Island as *H. crinanensis* according to the verification of Rev. C. R. N. Burrows.—H.J.T.

Occurrence of Pemphredon carinatus, Thoms., at Reigate.—On September 7th last I saw, on a post near Reigate, a small black wasp, that did not strike me as familiar, and captured it accordingly. I gave it to Mr. Frisby, who tells me it is *Pemphredon* (*Ceratophorus*) *carinatus*, Thoms. The diagnosis of the species will be found in *Ent. Mo. Mag.*, vol. xlvi., p. 10, by Saunders. The species is perhaps uncommon enough for its occurrence to be worth recording.—T. A. Chapman (M.D.) Betula, Reigate. *October 9th*, 1913.

Colias Edusa at Hailsham and Brighton.—I had expected to find reports in the magazines of many captures during 1913 of this charming insect, but, so far as recorded, few appear to have seen them in large numbers. I think, however, 1913 must be regarded as an *edusa* year if my experience be any criterion. I first noticed this insect in one of Brighton's busiest thoroughfares on May 27th, sailing between the traffic. I had not the wherewithal to effect a capture, although, by a coincidence, I had but a moment before left a Naturalist's premises where I had ordered nets, etc. I saw another at the Dyke near Brighton on June 15th.

During fourteen days' entomological work at Abbots Wood near Hailsham, in July and August, I secured 21, including one ab. *helice*. But the surprise awaited me on my return to Brighton. I found a clover field of 33 acres and spent several days in securing a dozen *C. edusa* and another ab. *helice*. Later, noticing boys chasing insects in an adjoining field where oats were standing in sheaves, I left the clover and was surprised to find the cornfield literally alive with *C. edusa*. In 15 minutes, before breakfast, I secured 20, and, having obtained sufficient, I watched the insects. It is no exaggeration to state that I saw hundreds, but not one *C. hyale*. Very few left the cornfield for the clover, a fact for which I am unable to account, since the cornfield last year had a potato crop and the clover field was in its second year's growth.

The last specimen I saw was on September 28th on the sea front at Hove.—Louis Meaden, Melbourne, Dyke Road, Preston, Brighton.

Hydrœcia crinanensis in Norway.—We have just returned from

Norway with a score or so of a *Hydroecia*, which Mr. Burrows identifies as *H. crinanensis.* This species has not yet been actually recorded outside the British Isles, though this is doubtless due, in the main, to the fact that very few entomologists are competent to differentiate the various members of the genus to which it belongs. The specimens were taken at Moen (also called Mo) in the South Trondhjems-Amt, 70 miles S.W. of Trondhjem itself. Moen is in the valley of the Sura, lat. 63°, the latitude of southern Iceland. The insect occurred, mostly at sugar, from August 16th till the end of the month, when we left the locality. Both sexes came to sugar, occasionally in some numbers. But though they came to sugar quite near the house, once only did one present itself at light. This, however, was partly due to the fact that Norwegian windows are not always made to open. Once a worn ♀ was taken flying over a bearded-wheat field in the sunshine at noon. Mr. Burrows firmly believes that the species is attached to running water. Certainly at Moen this was the case. But we also took the insect in the valley of the River Liddel, in Roxboro'shire, N.B., in 1909, and there it was occasionally found in numbers on dry hillsides. It is difficult to refrain from speculating on the probable food plants of *H. crinanensis.* In the Liddel valley we frequently took the insect on flowers of *Scabiosa* sp., and *Carduus palustris.* Of course it may well be that these are only frequented by the imago and are not the pabulum. Nevertheless some have thought that scabious will prove to be the creature's food. This plant certainly occurred at Moen with the thistles *Onopordon acanthium* and *Carduus arvensis. C. palustris* also occurred. Not many plants are common to the dry grass hills of Roxboro' and the damp low Sura valley. The Sura produced dock (*Rumex* spp.), which is the food of *H. nictitans*, and also the allied genus *Polygonum.* Both these plants were absent from Liddeldale. One is perhaps led to conclude that the food-plant is scabious or some thistle, unless indeed the larva is a general feeder, or a grass feeder.—P. A. Buxton (F.E.S.), and D. A. J. Buxton, Fairhill, Tonbridge.

CURRENT NOTES AND SHORT NOTICES.

In the *Canadian Entomologist*, for August, Mr. C. H. T. Townshend, of the Entomological Station, Lima, Peru, announces the discovery of another species of jumping maggot, in the flowers of a species of cactus (*Cereus* sp. ?) growing on the bare foot-hills of the Andes about 40 miles from Lima. These grubs were capable of jumping from six to eight inches from a hard surface, by curling the body until the head and anal plate end meet, and then suddenly straightening the body from the anal end. Specimens of the perfect insect (Diptera) were bred, and appear to be a species new to science, and constituting a new genus, probable an aberrant member of the *Sepsidae*, but partaking also of the characters of the *Milichiidae.* It has been named *Acucula saltans.*

M. Forel, at the International Congress of Entomology in 1909, computed the number of known species, races, and varieties of ants to be somewhat more than 6,000. In a recent note in the *Ann. Soc. Ent. Belg.*, he gives a summary of his own collection showing that it contains no less than 5,829 different forms, of which 3231 are quite distinct species. Hence his previous estimate must be considerably below what exists, as there must be many additional species and forms existing in other great collections of the world.

At a recent meeting of the South London Entomological and Natural History Society, Prof. E. B. Poulton, M.A., F.R.S., gave an address, with lantern slides, on "Mimicry in the Nymphalines of North America." The Professor was at his best, and probable no more lucid account has ever been given of the probable interrelations between the *Limenitis* group of the Nymphalines and the Danaines inhabiting the same area. His remarks were illustrated at each point with specimens and lantern slides, and the evidence chosen seemed so strongly to the point that even those opposed to the hypothesis of mimicry must have been compelled to admit more than the usual "There was something in it."

The Annual Exhibition of Varieties of the South London Society will be held at their rooms, Hibernia Chambers, London Bridge, on November 27th. The meeting opens at 7.30, and visitors and friends are cordially invited to be present and if possible to bring exhibits. There are two things we wish to urge on all those who exhibit, first, to label adequately and clearly, secondly to hand full details of their exhibits, and a note of any remarks they may make to the Hon. Secretaries at the meeting, for embodiment in the Report.

Five further parts of the *Lepidopterorum Catalogus* have come to hand. *Geometridae:* sub-fam. *Hemitheinae*, by L. B. Prout, is another masterly volume of 192 pages, and what we have said of his work before in this magazine, we can again say with emphasis, the compiler omits nothing which is likely to be of use to an earnest and thorough student. *Castniidae:* sub-fams. *Castniinae*, *Neocastniinae* and *Pemphigastolinae*, by K. W. von Dalla Torre, and *Brahmaeidae*, by E. Strand, with *Megalopygidae*, *Dalceridae* and *Epipyropidae*, by H. G. Dyar and E. Strand, deal with groups not so generally known, but they appear to be moulded on the lines of the first mentioned part by Mr. Prout. Numbers of references, at least all the important ones, are given to the Families, Sub-families and the Genera, and in the species the forms and aberrations are, as of course they should be, included. With regard to the two other parts, *Carposinidae*, *Heliodinidae* and *Glyphipterygidae*, and *Pterophoridae* (we find the author means what is now known as *Alucitidae*) and *Orneodidae*, by E. Meyrick, we can only deplore the issue of them, and repeat with emphasis what we said in a previous review, reserving for a future date a more detailed summary of the more glaring instances of "ignore"-ance of recent work, which in the interest of science should be generally known.

Part II. of the *Transactions of the Entomological Society of London* has recently been issued. There are sixteen pages of the Proceedings, containing a full and adequate account of the matters which are brought up at the ordinary meetings, and of which our own report is only a mere outline, and more than two hundred pages of the various papers read. Amongst these H. Eltringham contributes "On the Scent Apparatus in the male of *Amauris niavius*, L.;" J. C Moulton, "On some new and little-known Bornean *Lycaenidae;* together with a revision of the Thecline genus *Thamala*, Moore;" J. C. T. Fryer, "Pupal coloration in *Papilio polytes*, L.," and "The larval habits of the Tineid moth *Melassina energa*, Meyr.;" H. Eltringham and Prof. Poulton, "On new or little known forms of *Acraea;*" R. C. L. Perkins, "On the Classification of British *Crabronidae* (Hymenoptera);" the late G. H. Verrall (edited by J. E. Collin), "Descriptions of new species of the Syrphid genus *Callicera* (Diptera);" etc. There are thirteen plates.

In the *Ent. Mo. Mag.* for October, Mr. R. S. Bagnall, F.L.S., describes two species of *Haplothrips* as new to the British Fauna, *viz.*, *H. juncorum* and *H. distinguendus*, both from near Oxford.

The Annual Volume of the South-Eastern Union of Scientific Societies, *The South-Eastern Naturalist*, contains a record of the Society's activities during the year, an account of the Congress, which was held this year in the metropolitan area, *viz.*, at Hampstead, and the papers read at the Congress. None of these last could be strictly included in the term "Natural History" unless it be the capital paper giving an account of the "Geology of Hampstead" by Mr. F. W. Rudler, which we had the pleasure of hearing. There are four plates. The next Annual Congress will be held at Bournemouth in June, 1914, when we hope to hear a great deal about the Natural History of Hampshire and Dorset.

In 1911, the late Mr. G. H. Verrall, the well-known entomologist, bequeathed to the National Trust his property in Wicken Sedge Fen and St. Edmund's Fen, amounting to nearly 240 acres. These places are about the last remaining portions of the great undrained and uncultivated fens of the Eastern counties. They lie about seven miles South-east of Ely, and about 3½ miles west of Soham in Cambridgeshire.

A considerable sum—amounting to over £300—was payable as estate duty on the gift, but owing to the generosity of an anonymous donor, the Trust was enabled to accept the bequest.

The Fen cannot, however, be preserved in its natural condition without a considerable annual expenditure—an expenditure in excess of any sum which the Trust is able, having regard to other claims upon its funds, to devote to the purpose; and it has been decided that in order to deal with Mr. Verrall's bequest as he would have wished, an endeavour should be made to raise an adequate endowment fund.

The Trust is in no way desirous of restricting access for genuine naturalists, but it is anxious, as far as possible, to prevent over-collecting, and the exploitation of the Fen for commercial purposes. It is felt that the employment of a permanent watcher may go far towards the attainment of what all true nature lovers will desire, *viz.*, the preservation of the wild life of the Fen. A permanent watcher would be able to do something to check the indiscriminate "collecting" done by unscrupulous persons, which has gone far towards exterminating the rarer plants, butterflies, and moths.

To the zoologist the Fen has long been known as the home of rare Butterflies and Moths; of the former, *Papilio machaon* is the best known, but the Fen abounds in other species peculiar to marshy lands.

Subscriptions may be sent to The Secretary of the National Trust (S. H. Hamer, Esq.), 25, Victoria Street, S.W.

Mr. R. S. Bagnall, F.L.S., F.E.S., continues to work steadily at the study of the Thysanoptera and the other Orders of more or less obscure and little-known insects, which he so enthusiastically began some years ago. We have received copies of several articles written by him recently. "Brief Descriptions of New Thysanoptera," *Ann. & Mag. N. H.*, September, 1913, various Thrips from Africa and India. "The Scottish *Symphyla*," *Scot. Nat.*, August, 1913, seven of the fourteen British species. "*Lithobius duboscqui*, Bröle., a Centipede new to the British fauna," *Zool.*, August, 1913. "Two species of *Haplothrips* new to the British fauna," *Ent. Mo. Mag.*, October 1913. And "Notes on *Aeolothripidae*, with description of a new species," *Jour. Econ. Biol.*, September, 1913. We hope soon to have, from Mr. Bagnall's pen, a few elementary notes illustrated with detailed figures to enable our readers to recognise the members of these obscure orders, some species of which are of especial importance from an economic point of view.

A small but very interesting Exhibition of Photographs has recently been held at the Royal Photographic Society's rooms by members of the Nature Photographic Society. There were 132 very choice examples of nature photographs, including work by most of the well-known specialists. Mr. Hugh Main exhibited several of his beautifully executed life-histories, of which the series of the Maple-leaf-cutter Sawfly, of the Nest-making of *Polydesmus complanatus* (a centipede), of the Water-beetle (*Dyticus marginalis*) and of the Glow-worm were probably the best. Mr. A. E. Tonge showed a set of photographs of the eggs of British Butterflies and a most wonderful case of protective resemblance in *Bryophila glandifera* on a lichen covered wall. Mr. C. W. Colthrup showed several sets of the resting attitudes of British moths in their natural surroundings admirably illustrating their protective resemblance. Mr. A. H. Hamm showed the resting habits of several British butterflies including a print of the marvellous resemblance in the case of *Euchloë cardamines*. Among other exhibitors were Messrs. A. Frost, Somerville Hastings, Grace Kearton, C. G. Pike, T. M. Blackman, F. Martin Duncan, etc.

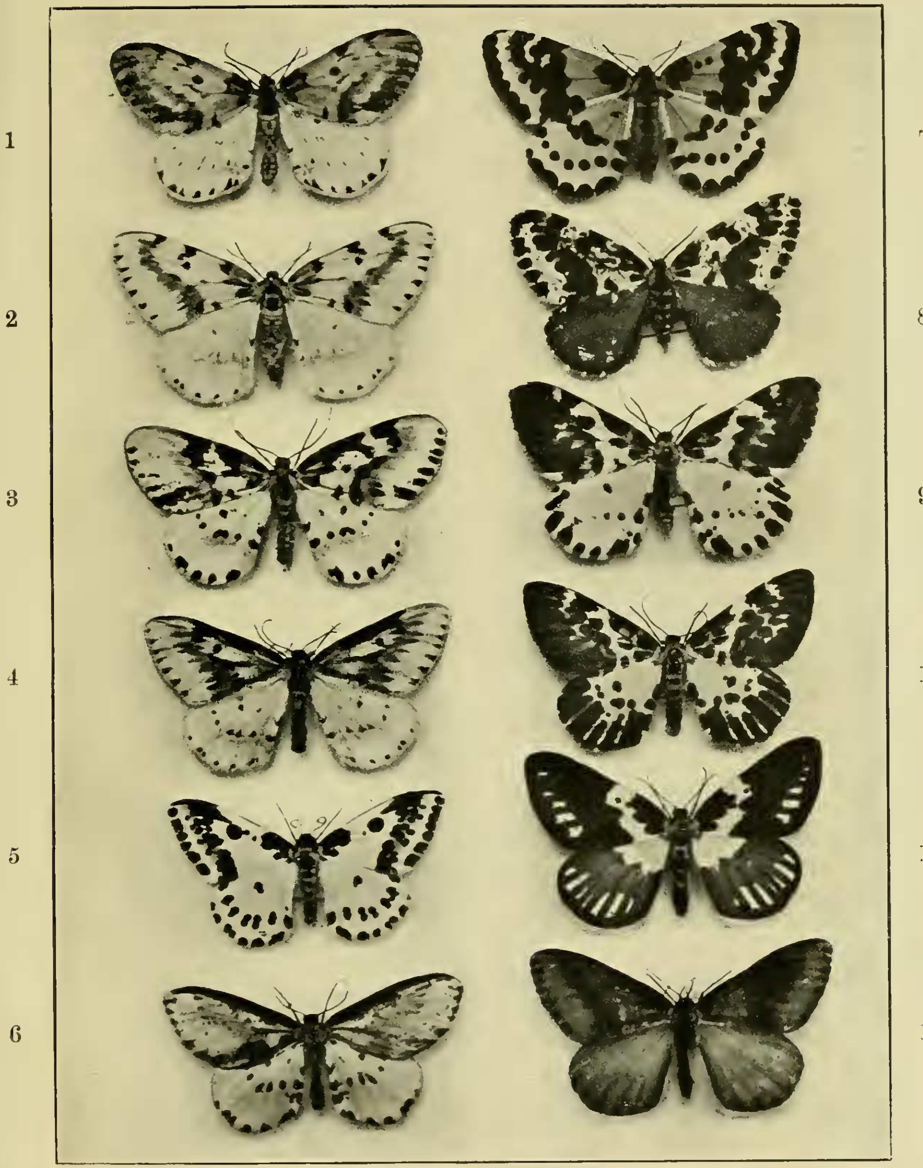
REVIEWS AND NOTICES OF BOOKS.

"*Transactions of the Cardiff Naturalists' Society.*" Vol. xlv., 1912 (pp. 128 + vi.).—Less than one-third of this volume is taken up with natural history strictly so called, of which our colleague Mr. J. R. le B. Tomlin, M.A., F.E.S., occupies some eighteen pages by a first instalment of a very full annotated "Catalogue of the Coleoptera of Glamorgan." There are also several pages of entomological notes by other contributors. Like many of our provincial societies, this Society has in the past scarcely carried on sufficient definite biological work to justify the words "Natural History" in its title, and we are pleased to have the opportunity of appreciating earnest endeavours to break from this custom. From Mr. Tomlin's introductory remarks we find that there are in Glamorganshire but few active present-day workers in biological science, although there have been a few notable students in the past. Much of the area has, however, never been worked systematically, and it is hoped that the present summary may be an incentive to the younger generation with their greater leisure and opportunities to take up some line of investigation in nature. We quote from the notes an item of more than local interest: "The extremely local *Nebria complanata*, L., one of the finest of the British ground beetles, was described as new to science by Fabricius in 1792, under the name of *Carabus arenarius*, in ignorance of the prior Linnean name, on specimens sent him from the Glamorganshire coast by the famous Sir Joseph Banks." Mr. Tomlin would be pleased to obtain any records which he does not possess of the district, and he would particularly like to ascertain where the late W. G. Blatch recorded his captures in the neighbourhood of Swansea in the latter half of the nineteenth century.—H.J.T.

Annual Report and Transactions of the Manchester Entomological Society, 1912. Price 1s.—The Report is a record of the Society's steady progress and success in keeping together a small body of local entomologists. There are now some fifty members, of whom a good proportion are known to us by their contributions, at one time or another, to our current magazines. The meetings have been well attended, and some interesting and useful papers have been read. Mr. W. Buckley, the President of the year, gave the annual address, dealing mainly with "Entomology and the Microscope." Mr. J. Mangan, M.A., gave a lecture on the "Larch Sawfly (*Nematus erichsonii*) and its Parasites," showing strong evidence that encouragement of natural checks is the only real control of the pest. Mr. H. S. Leigh, M.Sc., read a paper, "The Life-histories of the Leaf Insect (*Pulchriphyllium crurifolium*, Serv.) and the Mantis (*Sphodromantis bioculata*, Burm.)," which is printed in full in the Report. Messrs. B. H. Crabtree and C. F. Johnson gave interesting accounts of the butterflies met with on their holiday trips to the "Rhone Valley" and the "Pyrenees" respectively. The Rev. S. Proudfoot detailed his experiences in "Wicken and District." Mr. J. Watson gave a lecture on "The *Parnassiinae*, an Ancient Group of Butterflies," of which a summary is printed, and in addition contributed two important papers on the *Saturniidae*, a family which he has studied for many years, *viz.*, "Notes on the *Actias* Group of *Saturniidae* and Descriptions of two new Genera," and "The Genius *Philosamia*, Grote, and its Hybrids." Mr. B. H. Crabtree, F.E.S., has contributed a very beautiful plate of Varieties of *Abraxas grossulariata*, to the Report, from an admirable photograph by Mr. R. Tait, Jn., for the reproduction of which, in the present number, we are indebted to the kindness of the former gentleman. 'Tis a pity the spelling in the Report is weak.—H. J. T.

Explanation of Plate XXII.

Fig. 1.—♀. ab. *lacticolor-radiata*, Rayn. Ground colour of upper-wings luteous, hindwings creamy white; median band pale yellow.
,, 2.—♀. ab. *lacticolor-lutea*, Rayn. Ground colour of all the wings luteous; median band pale orange.
,, 3.—♂. ab. *albispatiata*, Rayn. Broad white area between central fascia and outer margin.
,, 4.—♂. ab. *gloriosa*, Rayn. Ground colour of all the wings golden; basal blotch and median band yellow and woad; broad black stripe extending along three-quarters of the costa.
,, 5.—♂. ab. *melanozona*, Rayn. A pretty form, examples of which were bred a few years ago by Mr. W. Reid of Pitcaple.
,, 6.—♂. ab. *nigrocostata*, Rayn. Broad black stripe extending along nearly the entire length of the costa.
,, 7.—♀. ab. *flavipalliata*, Rayn. Forewings with broad luteous area, like a mantle, between the black basal blotch and the discal spot.
,, 8.—♀. ab. *nigrosparsata*, Rayn. Hindwings exceptionally heavily dusted with black scales.
,, 9.—♂. Specimens with outer margins of forewings heavily blackened, central fascia brilliant yellow.
,, 10.—♂. Specimens with both fore- and hindwings deeply radiated with intense black; central yellow fascia much diminished.
,, 11.—♂. ab. *varleyata*, Porritt. With fore- and hindwings prettily radiated with white.
,, 12.—♂. ab. *nigrosparsata*, Rayn. All four wings entirely suffused with deep, slaty black, the ordinary markings appearing as though seen through a veil.



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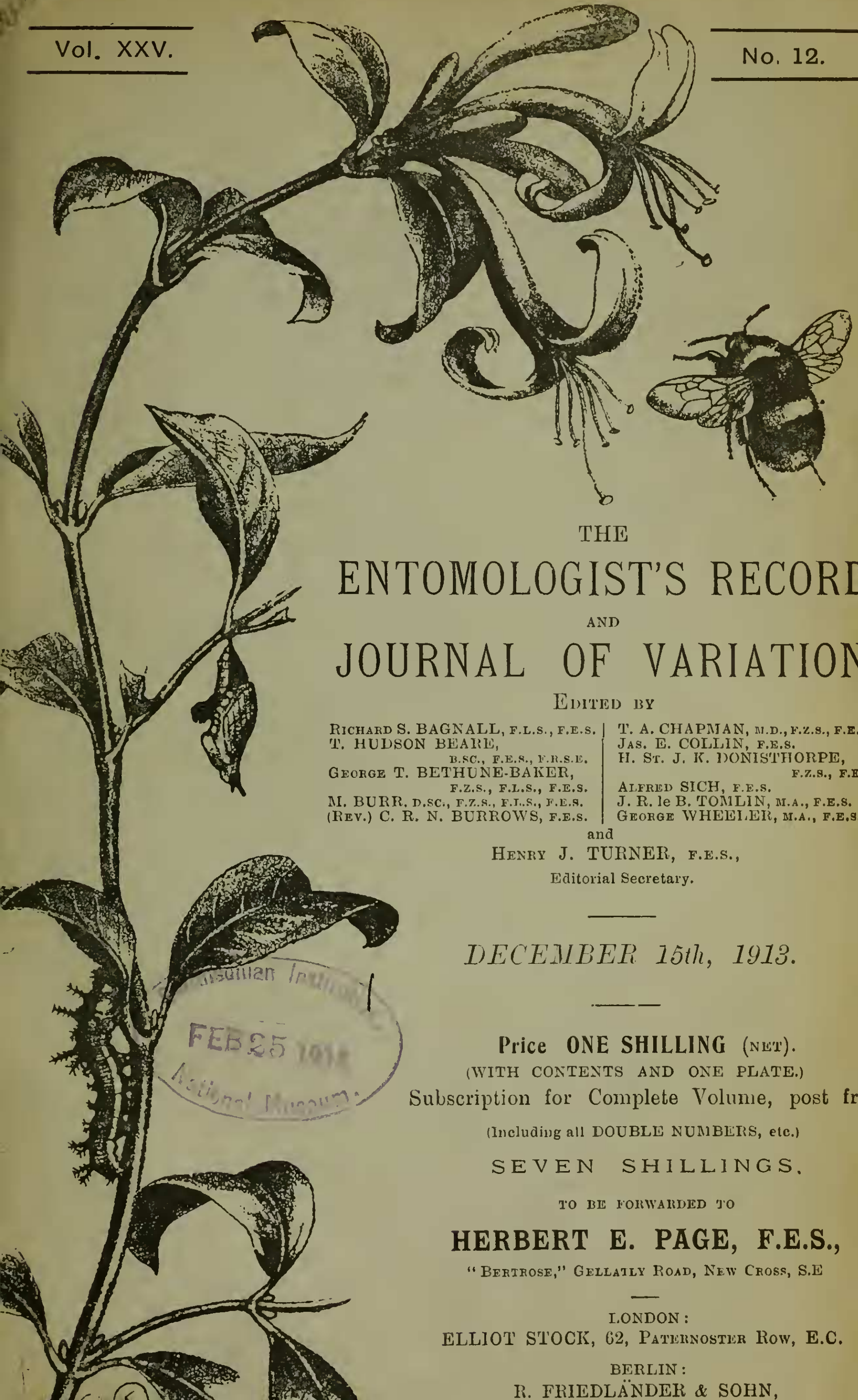

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AND

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Some Additions to the Isle of Wight List of Coleoptera.

By J. TAYLOR.

Unfortunately I have been able to do hardly any collecting during the last eighteen months, but as others have kindly told me of their captures, there are several beetles to record. They are:—

* *Bembidium clarki*, Daws.—Sandown, May (Newbery).

* *Metabletus truncatellus*, L.—In sedge tufts, Alverstone, April (Beare).

M. obscuro-guttatus, Duft., var. **atratus*, Dej.—Sandown, September (Bedwell).

* *Laccobius oblongus*, Gorham.—Sandown and Luccombe Chine, September (Bedwell).

* *Oxypoda longiuscula*, Er.—In moss, Sandown (Taylor).

* *Thiasophila inquilina*, Märk.—In nest of *Lasius fuliginosus*, Apse Heath, near Shanklin, August (Donisthorpe).

* *Calodera aethiops*, Gr.—In brickfield, Sandown, September (Bedwell).

* *Homalota vicina*, Steph.—On wall, Sandown (Taylor).

H. angustula, Gyll.—Sandown and Alverstone, April (Beare). (This species has been recorded from the Isle of Wight before, but from no exact locality.)

* *H. debilis*, Er.—In brickfield, Sandown, September (Bedwell).

* *H. sordidula*, Er. and **H. testudinea*, Er.—In stack refuse, Sandown (Taylor).

* *Myrmecopora brevipes*, Butler.—Ventnor, September (Bedwell).

* *Encephalus complicans*, West.—Sedge tufts, Alverstone (Beare).

* *Sipalia ruficollis*, Er.—Greatwoods, Shanklin, April (Beare).

* *Tachinus pallipes*, Gr.—Niton (Mitford).

* *Quedius molochinus* var. *hispanicus*, Bernh. (*hammianus*, Sharp).—In salt marsh, August (Donisthorpe).

* *Philonthus quisquiliarius*, Gyll.—(Type form, only the var. *dimidiatus* being recorded previously). Bank of pond, Sandown (Newbery).

* *Actobius cinerascens*, Gr.—In brickfield, Sandown (Bedwell).

* *Leptacinus batychrus*, Gyll.—Sandown, August (Donisthorpe).

* *Lathrobium forulum*, Steph.—In sedge tufts, Alverstone (Beare).

* *L. quadratum*, Pk.—In stack refuse, Sandown, April (Beare).

* *Achenium humile*, Nic.—Yaverland, September (Bedwell).

* *Cryptobium glaberinum*, Hbst.—Alverstone (Beare).

* *Medon obsoletus*, Nor.—In brickfield, Sandown (Bedwell).

* *Stenus pusillus*, Er.—Sandown (Beare).

* *Trogophloeus rivularis*, Mots. and **T. subtilis*, Er.—Sandown (Bedwell).

* *Lestera heeri*, Fauv. (*punctata*, Duv.).—Bembridge (Donisthorpe).

* *Homalium vile*, Er.—In stack refuse, Sandown (Bedwell).

* *Megarthrus affinis*, Müll.—Sandown (Beare).

* *Neuraphes angulatus*, Müll.—In sedge tufts, Alverstone (Beare).

* *Scydmaenus collaris*, Müll.—In sedge tufts, Alverstone (Beare).

* *Melanophthalma distinguenda*, Com.—Parkhurst Forest (Donisthorpe and Nicholson).

* *Necrobia ruficollis*, F.—Newport (Donisthorpe).

DECEMBER 15TH, 1913.

Longitarsus jacobaeae, Wat., var. **rufescens*, Fow.—Sandown (Bedwell).

* *Salpingus castaneus*, Panz.—Parkhurst Forest (Nicholson).

* *Mordellistena neuwaldeggiana*, Pz.—Sweeping in lane, Morton, August (Donisthorpe).

* *Rhynchites aeneovirens*, Marsh.—Alverstone (Taylor).

* *Thryogenes scirrhosus*, Gyll.—"Pits," Sandown (Donisthorpe).

* *Smicronyx reichei*, Gyll., and also its var. **championis*, Fow.—On *Cuscuta epithymum*, Parkhurst Forest, August (Donisthorpe and Nicholson).

* *Rhinoncus castor*, F.—Lake, near Sandown (Newbery).

* *Calandra oryzae*, L.—In rice, Sandown (Taylor).

Mr. E. A. Newbery kindly named my *Homalotae*.

A var. of *Stenus binotatus*, Ljun., with black antennæ was taken at Sandown by Mr. Donisthorpe while sweeping water plants; fortunately the specimen was a male.

Notes on the capture of Claviger longicornis, Müll., and a Description of its supposed Larva. (*With plate.*)

By H. St. J. K. DONISTHORPE,, F.Z.S., F.E.S.

P. W. J. Müller, who described *Claviger longicornis*, in 1818, points out that it lives with a yellow ant that is somewhat larger than *Lasius flavus*. (This ant would be either *L. umbratus* or *L. mixtus*, both of which were described by Nylander in 1846). Subsequently Rouget, Lokaj, Saulcy, Reitter, Richen, Rupertsberger and Wasmann, all captured it with *L. umbratus*. Ganglbauer records it with *L. brunneus*, Schenck, and von Hagens with *L. niger*, and Forel found a specimen with *Myrmica laevinodis*. Wasmann, who studied it at Prague, established in 1894, that its normal host was *L. umbratus*, that it was found more rarely with *L. brunneus*, rarely with *L. niger*, and with *Myrmica* as a chance capture. Schmitz discovered it at Maastricht in 1907 with *L. umbratus*, and next year he published a most interesting paper on this fine myrmecophile.

In our own literature the following references to *C. longicornis* occur:—Janson, the pioneer in the study of British myrmecophilous coleoptera, writes in 1857—"In Germany and France a second species of *Claviger* (*C. longicornis* Müller) is found . . . . if assiduously searched for it would probably be met with here." It does not appear to be mentioned again till 1908, when Donisthorpe, in a short paper on the British ants, points out that *C. longicornis* is found with *L. umbratus* on the continent, and remarks, "When shall I capture, or hear of the capture of this beetle here?" On November 2nd, 1910, the same observer exhibited a specimen of this beetle with its host *L. umbratus* taken by Schmitz in Germany, at a meeting of the Entomological Society of London, and said it should occur in Britain with the same ant. On March 20th, 1912, Walker exhibited five specimens taken by him in 1906 in nests of a small black ant under stones near Kirtlington in Oxfordshire. He had put them away in his duplicate boxes under the impression they were the common species *C. testaceus*, and had only just found out what a prize he had taken. In May, 1912, when recording the species as a British insect, he remarks that he believes the ant they were found with was *Formica fusca*, subsequent events, however, have proved this not to be the case.

On May 1st this year Walker found another specimen and shortly afterwards Collins took two more, the host in each case being *L. niger*. Walker records these captures in a note entitled—"The Host of *Claviger longicornis*, Müll., in England." This is rather misleading, since as will be seen shortly, the normal host is here, as elsewhere, *L. umbratus*, or its sub-species *L. mixtus*. On May 14th Walker kindly took me to his locality and we visited all the *niger* nests in the neighbourhood, without result. On May 16th I went to Box Hill, in Surrey, where I knew *Lasius mixtus* to occur, and on finding a nest I was at once rewarded by the capture of three specimens of the *Claviger*. (The same myrmecophiles live with *L. mixtus* that are found with *L. umbratus*. I took the rare Acari, *Trachyuropoda bostocki*, *Sphaerolaelaps holothyroides*, and *Antennophorus uhlmanni*, which I have before found with *L. umbratus* in other localities in England. Janet records the same species with *L. mixtus*.) The colony was situated in the deeply embedded root of a tree stump, part of which broke off when I was working at the nest, and this I left as a reserve. On May 17th I went to Oxford again, and hunted with Collins in the *niger* nests there. As before no *Claviger* turned up, but I found a colony of *L. umbratus*. The nest was situated in a bank, the ground being so stony that it was impossible to dig it up, a ♀ with three wings (one of last year's brood), and a few ☿ ☿ only being exposed. On May 23rd I again visited my *mixtus* nest at Box Hill, but found that the ants had deserted the remains of the tree root. Patient search produced two more colonies of *L. mixtus* in deeply embedded tree roots, in both of which a *mixtus* deälated ♀ occurred. In the smaller colony three of the *Claviger* were found, but in the other, a large and very populous one, over twenty specimens were present.

The deeply embedded roots correspond with Schmitz's deeply embedded heavy stones, the reason being that *L. umbratus* and *L. mixtus* are much more subterranean in their habits than *L. flavus* or *L. niger*. I have heard from my friend Bedwell, to whom I had explained my method of finding this beetle at Box Hill, that he took twenty specimens in one nest on June 7th.

On September 7th I was again at Box Hill to try and obtain ♂ ♂ and winged ♀ ♀ of the ant. In this I was successful, and also saw six specimens of the *Claviger*. It is thus clear that though *C. longicornis* occurs sparingly with *L. niger* in Oxfordshire, should a colony of *L. umbratus* or *L. mixtus* be found there, which could be properly investigated, the beetle would no doubt be found as freely as in Surrey.

I may mention that I introduced live specimens of this *Claviger* into my *L. umbratus* observation nest last May, and that they are still alive to-day (November 27th). They now generally sit on the body of a *L. fuliginosus* ♀, which has been accepted as a queen by the *umbratus* ☿ ☿.

On my last visit to Box Hill, on September 28th, the beetle was not observed, but two specimens of a beetle larva unknown to me, were found in a *L. mixtus* colony, which may be *Claviger* larvæ. One of these I brought home and introduced into my nest, where it was not attacked by the ants, but died in two days, the other I put into spirit and sent it to my friend Father Wasmann, and he tells me it is unknown to him and that it may possibly be *C. longicornis*, and as the larva of *Claviger* is unknown, he advises me to describe it. Accordingly I made a short description, but on sending the specimens to Dr. Chapman, he kindly executed the plate given herewith and drew up a much more lengthy and complete description, which I have inserted in place of my own.

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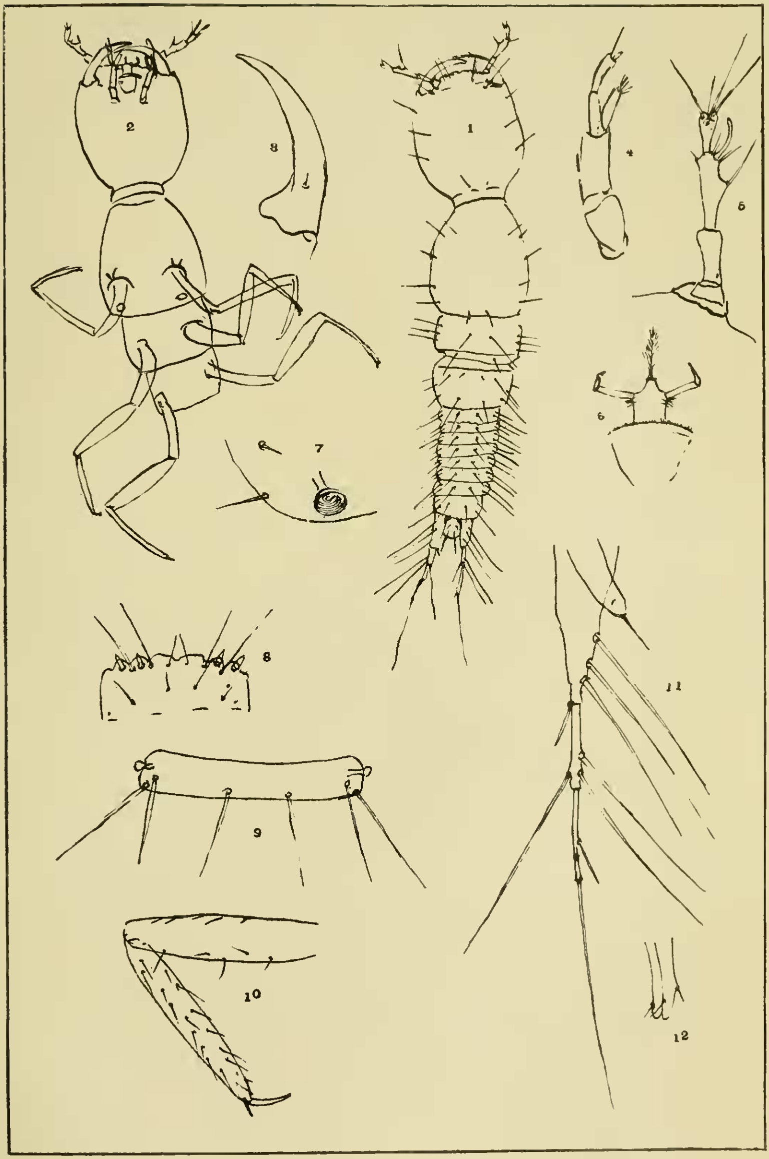
By DR. T. A. CHAPMAN.

The larvæ are preserved in alcohol and are very rigid, and are so delicate that I did not care to submit such rare specimens to any strong reagents to soften them—my examination of them was therefore in some directions decidedly limited. They are of a pale chitinous brown and their appearance of softness and delicacy gives probably a correct impression, as various parts, legs, cerci, etc., are collapsed and distorted by the shrinkage of the contained tissues in the alcohol. One is struck by the great size of the head, jaws, and first thoracic segment, a well-developed *Ocypus olens* does not approach it in this respect.

The total length (from end of antennal hairs to end of cerci hairs) is nearly 4·0mm., of the body only about 3mm., of which the head is 0·9mm., the prothorax 0·7mm., the meso- and meta-thorax together 0·6mm. and the abdomen about 0·8mm. The head is 0·7mm. across, and is rather square, having somewhat parallel sides, and being somewhat straight across the front, the large curved jaws, however, give a rounded curve to the front margin. The head has various hairs (see plate xxiv., fig. 1). The jaws are long, sharp with a fine sweeping curve, without other teeth than the sharp point, there is an abortive hair towards its base, its length is 0·4mm. (fig. 3). The antennæ arise close to the base of the jaws, are 0·36mm. long, or 0·48mm. if terminal hairs are measured. They are four-jointed, the



Del. T. A. C.

Larva of Claviger longicornis, Müll. (?)

lengths of the segments being as 1, 3, 4, 2½. The first and second are simple, the second a little swollen terminally, the third is angular and elaborate, a projection of the inner margin carries a strong hair. The extremity of the inner margin slopes outwards and carries several short hairs and a curious curved joint, the fourth joint carries four terminal hairs, three larger than the other, and each on a rounded projection, giving a trefoil clubbing to the end of the joint (fig. 5). The labrum 0·27mm. across and 0·1mm. deep is nearly rectangular, the margin being slightly curved. The margin is crenate, the two central crenations having a straight margin, the next two on each side are rounded and each carries a short pointed baton and a hair behind its inner margin, there are several other short hairs (fig. 8). What appears to be the maxilla, but of which much can only be seen by the transparency of the parts, is 0·44mm. long, has a first and second strong broad joint, from the end of the second proceeds, 1st, a two jointed process, the last joint carrying a minute palpus and a hair; 2nd, a single jointed process with a fringe of short hairs at its extremity (fig. 4). The labium is a square plate, produced, however, in front, about 0·06mm. wide and 0·08mm. long, at the anterior corners on either side is a three-jointed palpus, the second joint short, the third minute. At the base of each palpus is a fan of minute hairs, and the extremity in front is a feather-like process, with very numerous down-like hairs (fig. 6). Immediately behind the labium is a dark transverse line of finely fringed chitin, behind this a simple line, bounding a somewhat triangular, more transparent area (fig. 6).

The prothorax carries sundry hairs (fig. 1), and a spiracle on either side just below its posterior margin (fig. 7). The spiracle presents a series of nearly concentric circles and is about 0·06mm. across, the legs of this and the two succeeding segments arise towards the posterior margin of the segment. The legs are somewhat shrunk (in places) and distorted, but they consist of a basal portion (coxa) which is about 0·4mm. long, rather curved, and in life is probably directed downwards, the trochanter is not distinguished, the femur and tibia are about the same length as the coxa, and have numerous hairs. There is a terminal spine (a stronger hair) to the tibia, and a short, curved sharp claw 0·07mm. long (fig. 10). The abdominal segments have each a long hair on each side of the dorsum and two at either margin and a spiracle that projects in a somewhat bulbous form in the specimen (fig. 9).

The eighth (and last with spiracle) abdominal segment carries on each side a long (0·64mm.) dorsal process (cercus ?) apparently three-jointed, with sundry very long hairs, the terminal one 0·45mm. long (fig. 11), ventrally each side has also a much simpler process (figs. 11 and 12). The ninth abdominal segment, as seen from above, is a slight, nearly square plate (fig. 1), with a pair of longer and a pair of shorter hairs. Probably this is really the tenth, the ninth being obscured by shrinkage.

DESCRIPTION OF PLATE XXIV.

Fig. 1.—Dorsal view of Larva (legs omitted) × 20.
,, 2.—Ventral view of larva to show legs × 20.
,, 3.—Mandible × 70.
,, 4.—Maxilla × 70.

,, 5.—Antenna ×70.
,, 6.—Labium ×70.
,, 7.—Posterior corner of prothorax with spiracle ×70.
,, 8.—Labrum ×70.
,, 9.—Dorsal aspect of third abdominal segment ×70.
,, 10.—Femur and tibia of intermediate leg ×70.
,, 11.—Right cerci (dorsal and ventral) ×70.
,, 12.—Side view of ventral cerci ×70.

P.S.—M. Peyerimhoff has seen one of these larvæ since the above was written and does not think it is that of *Claviger*. At the same time the fact that the larva is without any trace of eyes (a point not mentioned by Dr. Chapman) appears to me to be very significant, since the perfect insect in the genus *Claviger* is also blind.—H.St.J.K.D.

A Further Note on Erebia gavarniensis, Warren.

By H. ROWLAND-BROWN, M.A., F.E.S.

I was much interested to read Mr. Brisbane Warren's observations upon *Erebia manto* and its forms (*anteá*, pp. 273-277), the more so as he was my companion in the summer of 1911, when we captured the butterfly which he has christened *Erebia gavarniensis*. What Mr. Warren says about the Gavarnie "*manto*" is perfectly correct up to this point; it is a separate species from the *manto* of Central Europe. But when he avers that the Pyrenean race "has no claim to the name *caecilia*, or to any connection with it," I must join issue with him. Had he asked Mr. Wheeler to refer to M. Charles Oberthür's notes on the species (*Lépid. Comparée*, fasc. iii., p. 291), he would have been informed that Boisduval had already considered the matter, and also M. Oberthür himself. I find that the former author in his "*Europ. Lepid. Index Methodicus*," published at Paris in 1829, arranges the species as follows:—

pyrrha, H., Och., God. . . . . . Alpes . . . . . Julii
machaboeus, Encycl.
var. *caecilia*, H. (totus niger) . . Pyren. . . . .

Boisduval, therefore, is emphatic that *caecilia* is "entirely black," and that it haunts the Pyrenees only.

Now let us see what M. Oberthür says as to the specific identity of *manto* and var. *caecilia*. "*Manto*," he writes (*loc. cit.*), "varies greatly. Its most remarkable variety is *caecilia*, Bdv. (*Icones*, pl. 33, figs. 5 and 6)":—not *caecilia*, Hb., be it observed—"I find that *caecilia*, Hübner (Nos. 213 and 214), does not represent the same butterfly; in the case of *caecilia*, according to Boisduval, the underside of the forewings is entirely black, and is not marked with red as in Hübner's figure."

Boisduval, however, does not appear to have had any females of *caecilia* in his collection. M. Oberthür possesses, I believe, the Boisduval types in his great collection. At all events, he goes on, "Boisduval possessed but one male *caecilia* which is apparently that reproduced in the '*Icones*.' When he says (p. 168) that the Auvergne and Pyrenean females are very like those of the Alps, he certainly forms his judgment without authentic evidence, for the assertion is absolutely erroneous."

My own opinion, then, is that Boisduval's name *caecilia* refers to the type of this lately separated species, and that var. *caecilia*, Hb., stands for a central Alps (and other localities) variety (and aberration) of *manto.* The fact that Boisduval in his "Catalogue" places H. after the name does not appear to affect the application in view of the conclusive "totus niger" which accompanies it, and the given locality of the Pyrenees.

I may add that M. René Oberthür captured *E. caecilia*, Bsdv., at Le Lioran, where I looked for it in vain in August, 1909, being obviously too late on the ground; and M. Charles Oberthür in this instance is not prepared to differentiate the Cantal *caecilia* from those of Cauterets and Gavarnie. Whether typical *manto* occurs in the Pyrenees is extremely doubtful.

M. P. Rondou, a first rate entomologist and observer, who lives at Gédre below Gavarnie, says (*in litt.*) that typical *manto* never occurs there. Pierret, in 1848, records, probably in error, a single female *caecilia*, Hb. But neither de Graslin nor Bellier mentions either type or variety in their respective list of captures hereabouts (*Trans. Soc. Ent. France*, 1857-1858).

Caradja (*Beit. zur Kentniss des Grossschmet. des Depart. Haute-Garonne*, "*Iris*," 1894, Dresden) mentions several localities in his catalogue where he asserts that the type occurs with ab. *caecilia*—Mont d'Antenac, Porte Venasque, Lac d'Oo, Lac Vert, Porte de la Picade.

D'Aubuisson (*Cat. . . . de la Haute-Garonne*, "*Bull. Soc. Nat. Hist. Toulouse*," *t. ii.*, 1868, *suppl.* 1885) adds, for type and var. alike, Mont Cagire (1800m), Saint-Béat (520m), and Luchon (622m); *caecilia*, "rather rare."

But I do not accept Caradja as an accurate guide to the alpine butterflies of his region. Guillemot, who is more reliable in this respect, informs us (*Cat. Lépids. du Puy-de-Dôme*, p. 43) that the type and var. *caecilia* occur together on the elevated pastures of Mont-Dore in July, and that the variety is more abundant than the, type "which is never so marked as the Swiss form."

That there should have been some confusion among authors as to the relative identity of *caecilia*, Hb., and *caecilia*, Bsdv., is natural enough. But if we are satisfied that Boisduval's *caecilia* is the same insect, which Mr. Warren and I took in the iris fields of the Val d'Ossue at Gavarnie, then I think there is no justification for him to assert that the Pyrenean race has no claim to connection with the name *caecilia*. I find also on careful examination of my series of *gavarniensis* taken in this locality (17 males, 5 females) that in the male the rust-coloured spot near the apex of the forewings on the upper side is seldom present. But, in the case of the females, while I have one with *three* large lemon-coloured spots on the underside of the hindwings, in each case on the forewings there is an indistinct rust-coloured mark near the apex, and this contains two well-marked black spots. Mr. Warren says "no eye-spots" in his diagnosis of the species, with which otherwise my examples more or less agree.

Protective Resemblance.

(*Continued from page 250.*)

By C. W. COLTHRUP.

Of what use is it to the Blackbird to be black? It certainly is no handicap in the struggle for existence, yet its near relative the Song

Thrush, whose habits are very much the same, is supposed to be protectively coloured. In the course of my wanderings in the barest and most remote parts of the South Downs, I have found it almost impossible to get out of range of the Blackbird's note (not that one wants to), but the Song Thrush is absent. If there is only one gorse bush, there you will find a Blackbird nesting and advertising its presence on the top of the bush by its song. Yet here Hawks are plentiful and the Downs are regularly quartered by Peregrine Falcons, Sparrow Hawks and Kestrels. If the reverse was the case, *viz.*, the Song Thrush present and the Blackbird absent, it would probably be suggested that the former, being protectively coloured, enjoyed immunity from attack, and the latter through being conspicuously coloured had been killed off. One reason for the absence of the Thrush is that it likes a high tree from which to sing, and haunts the clumps of trees, which are sparsely scattered in some parts of the Downs.

Mr. Curtis says on p. 153 in speaking of the increasing discrimination of the birds, "*as the discriminative faculty would be enhanced in each generation by the fact that the bird who successfully discriminated, would have a better area of food supply, because it would be sure of palatable insects all the time, instead of chancing unpalatable insects.*" I agree. The bird would not need to chance the "unpalatable" insects, however, but would make use of the above discriminating faculty and devour the supposed "mimic." Does Mr. Curtis not see that this undermines the theory of mimicry and the end for which it is supposed to be working, *viz.*, the protection of the "palatable" species. With regard to Models p. 154, it is news to me that *Leucoma salicis*, *Spilosoma lubricipeda* and *S. menthastri* come under this head, as I have frequently found their severed wings, also those of the Wood Leopard Moth, *Zeuzera pyrina* (*aesculi*), a most evil smelling moth, under electric arc lamps. On what difference, I wonder, does Mr. Curtis base his assumption that *Porthesia chrysorrhoea* is palatable, and *S. lubricipeda* and *S. menthastri* unpalatable? From a field naturalist's point of view the models and mimics suggested on page 154 are about the limit. His admission that he does not know the "models" for *Ægeria tabaniformis*, etc., and his guess that "they are *certainly* Hymenopterous insects which are *probably* armed in some way," is not evidence. Surely it would have been more scientific to obtain positive evidence before putting the claim forward. Mr. Curtis in the last paragraph on p. 154 says "looking at the above list it is obvious to the most superficial person that the earliest appears after birds have received an immense accession of numbers by the migrants' arrival, that insect life is at its highest point, etc." My interpretation of the above is that the warmer weather induces more species of insects to emerge and the same cause induces our summer migrants to return. Were there not a sufficient insect diet we should not get them. Further, insect life being at its height, there is more chance of finding some species resembling others than when insect life is at its lowest.

It is past my comprehension why "*it is an integral part of the theories that warning colours lose their utility, to a large extent, when insect food is scarce.*" I should have thought the palatable insects needed them more at this time. Mr. Curtis says nothing here (although he mentions them later on) about the large influx of insect-eating birds we get from the North and the Continent, in the Autumn, which stay with us till the Spring. The "integral part of the theories" quoted above strikes me as an ingenious though abortive attempt, of so ardent an advocate as Mr. Curtis, to get out of admitting that he cannot make his theories fit nature. On page 155, after mentioning *Anthrocera filipendulae*, *Arctia caja*, etc., in connection with "Warning Colours," he says, "one and all appear during the time insect life is most abundant and when the birds would not be driven to unpalatable food." Why should these insects be protected at the expense of the "palatable" insects. The latter, however, survive notwithstanding. How is it that so many cocoons of *A. filipendulae* are found broken open and the contents eaten if they are unpalatable. Again on the same page Mr. Curtis makes it appear that it is *only* "*in the Winter months and Spring, when our insectivorous winter residents are busy and hungry, that our lepidopterous insects seek the retiring garb of russet-brown and dead leaf colours, or else dress themselves in the soft greens and greys of the lichen covered trees*," whereas he must know that moths are about all through the Summer with similar colours and form the class, which must be the "palatable" insects, on which the Summer insect-eating birds obtain their living. On page 155 Mr. Curtis says "In some cases the writers seem to go to the absurd extremity of rejecting everything in favour of the theories, whilst seizing upon and insisting upon every little point, which they think tells against the theories." Surely Mr. Curtis should not complain seeing that he does exactly the same in favour of the theories. It is not enough to generalise "for or against," but necessary also to particularise. With regard to experiments on birds in confinement, and in spite of Mr. Curtis's charge of "bitterly prejudiced obsession," I maintain that these tests are of little value, as it is a well-known fact that well-fed birds in confinement will refuse food that will be readily eaten by their own kind in a wild state. A wild bird is trained from the nest to feed on various insects. It is very illuminating how easily Mr. Curtis disposes of anything which may tell against these experiments, as on p. 156 he says, "I also believe that the fact that the bird and insect may not necessarily be a bird and insect, which would normally meet in the wilds *to be a fact of very little moment*." How very convenient! I should have thought that it would have made the experiment valueless because it is quite understandable that a bird might be shy of a strange species. Again, individual birds of the same species often have very different tastes, one Kestrel will feed almost entirely on *Agriades coridon*, another on small birds and mice, and oft another will attach itself to a pheasant rearing field and take only young pheasants. On the same page, in speaking of the known partiality of the Redbacked Shrike for humble bees, to which I have also referred (*anteà* p. 248) he says, "*I do not think that the fact that Lanius collurio* (*the Redbacked Shrike*) *has a known partiality for bumble bees, sufficient to discount the results attained by these highly instructive experiments.*" Again, very convenient! It is at any rate absolute proof that the humble bee is not a distasteful species to the Redbacked Shrike. One is an artificial experiment, the other an observation from nature.

With regard to experiments on birds in confinement, it may not be out of place to refer to an article in the October number of *British Birds*, by the editor, Mr. H. F. Witherby, on "The sequence of plum-ages of the Rook, with Special Reference to the Moult of the Face." The adult rook's "face" is bare, whereas the carrion crow's "face" is covered with bristle-like feathers, and it has long been a disputed point as to whether the former gets its bare face by means of a moult, or by abrasion of the feathers when digging the ground for food. Mr. Witherby has been carrying out investigations on birds shot in a wild state, in every month and nearly every week of the year for two years, and proves pretty conclusively that the feathers are lost in the first winter-moult, after January, and not by abrasion. He summarises the experiments that have been carried out from time to time on birds in captivity, and in one instance, "even after its second winter-moult, the face was fully feathered, and in another case a bird did not get a bare face until its second autumn-moult." He remarks, "It is well known that birds in captivity often moult most irregularly, and *this is a good instance of the danger of drawing conclusions regarding moult and sequences of plumage from captive birds.*" My contention is that *a similar danger exists from drawing conclusions regarding the rejecting of insect food by captive birds.*

Mr. Curtis is mistaken on p. 156, when he assumes that I "view the question of protective coloration from the narrow standpoint of attacks on lepidopterous imagines only," as I think I have sufficiently indicated in the above notes. True, I only mentioned *Polia chi* in my original note, but then I was replying to a previous note on this insect. I would suggest to Mr. Curtis that he should take into consideration, not only the attacks by birds, but also the attacks of spiders, bats, lizards, ichneumon and other flies.

Mr. Curtis says on page 157, "*The theories would lose their value to me entirely if they could not be applied throughout and to their logical extremity.*" Yet at the end of the next paragraph he finds it necessary to cover himself by saying, "*the supposed exceptions are the result of interaction of laws which we have failed to elucidate.*" In the same paragraph he says, "*I do not believe that natural laws operate in a piece-meal style, everything that I know tends to make me believe that every law in nature is carried into operation in its entirely,*" with which I agree.

The Mimicry theory falls far short of this, however, otherwise all the "palatable" species would receive protection in the same way, and I fail to see why some "palatable" species should be protected at the expense of others. Again, how is it that "distasteful or unpalatable" species do not become pests through their immunity from attack, what keeps their numbers down? The fact is "nature" is one vast tragedy, and the lucky ones escape. The birds feed on insects, mollusca, worms, etc.; ichneumon fly larvæ on lepidopterous larvæ; stoats, adders, crows, etc., feed on young birds and so on. If these natural laws work for the protection of butterflies, why do they not also operate for the protection of young birds, whose mortality is so high, by making them distasteful? I think the answer is obvious. By doing so "nature" would upset the balance and we should be overrun with birds, and so it would be with the supposed "unpalatable" butterflies and moths. With regard to the striking resemblances between different species of butterflies, etc., this may be a reversion to type of marking of a common ancestor. The fact that they are distinct species now is an exemplification of the variability of "physical means and machinery" producing similar results, as regards wing marking only, as in the case mentioned by Dr. Cockayne (*Ent. Record*, p. 219) of *Argynnis niphe* var. *javanensis* and *Danais chrysippus*, the former generally accepted to be a mimic of the latter, yet they prefer a different kind of locality and fly at different altitudes, and in Japan only the fritillary exists. If they had been flying together it would have been cited as an instance of mimicry. I note that Dr. Cockayne considers this as one of those cases of accidental resemblance, "of which many other wonderful examples could be collected," and his remark that "these accidental resemblances must occur, owing to the strictly limited range of size of Lepidoptera and of possible colours and patterns," is very much to the point, but I fail too see why these circumstances should not operate when insects are flying in the same locality as when they are miles apart.

With regard to certain species of butterflies that have two or three forms of the female that are supposed to "mimic" separate species of butterflies, I have in my mind an almost parallel case in the eggs of the Tree Pipit. They are among the most variable of birds' eggs, and are to be found in various shades of grey, brown, red, pink, green, etc., blotched, spotted or finely speckled. One clutch could be easily mistaken for a variety of the House Sparrow's, another a Chaffinch's, another a Reed Bunting's, another a Reed Warbler's, etc., and they can often be found in close proximity. It is certainly, however, not a case of "mimicry." The Cuckoo is another bird that lays most variable eggs, and as far as observations go, each female always lays the same type. The egg is laid on the ground and the female carries it in her bill and deposits it in the nest of the foster parent. Now it is often stated that the bird carries the egg about till it finds a nest with eggs that match it pretty closely. I have made careful observations on a number of nests, in various localities that I know are haunted by Cuckoos, for some years, and found it quite the exception for a Cuckoo's egg to match those of the foster parent, although had it been so disposed, the female could easily have accomplished it. I have found Skylark types of Cuckoos' eggs in Hedge Sparrows', Robins' and Pied Wagtails' nests, a Pied Wagtail type in a Hedge Sparrow's nest, a greyish type in a red Tree Pipit's clutch, and a pink type in a grey Tree Pipit's clutch, and so on. In only one case did I find a type that nearly matched a Robin's clutch. Other observers have confirmed my experience. One fact is pretty well proved and that is that each individual Cuckoo, as far as is possible, places its eggs in the nests of the same species, and that, probably, the species that reared it. I mention the above to show that although there may be striking resemblances in nature, the human deductions from the observed facts are not always correct.

Mr. Curtis says "it is open to them (the opponents of the theories) to supply, and in fact necessary that they should supply a rational explanation of the extraordinary likeness between organism and organism, etc." At a recent meeting of the South London Natural History Society, Professor Poulton previous to his lecture, exhibited lantern slides showing a foreign species of Wasp, the male of which had horns on the head similar to those of the Stag-beetle. From the observation of the gentleman who sent them over, it appeared that these horns were used in fighting for the possession of the females, which seems a very rational explanation of their use. Why then should it be necessary to supply a rational explanation of the extraordinary likeness between organism and organism, *viz.*, the horns of the wasp and of the stag-beetle? Would Mr. Curtis call this "Mimicry?"

On page 158, Mr. Curtis says, "If the opponents merely say that they oppose the application of the *theories* to lepidopterous imagines, for I cannot see how they can contest the application of the *theories* to the other orders and larval stages, *do they want two theories when one will do?*"

If *one* theory will do, why does he continually refer to *the theories*— "Protective Resemblance," "Warning Colouration," and "Mimicry," to say nothing of "Aggressive Resemblance," which is now put forward in other quarters.

(*To be concluded.*)

Early Summer in the Valais and North Italy.

By B. S. CURWEN.

My entomologizing excursions this Summer took me in the main to familiar localities. This season, however, was undoubtedly an abnormal one, and some of my records may in consequence prove of interest. Thanks to Messrs. Wheeler and Alderson, I was able to go to the right spot for certain species.

On June 15th I worked Eclépens from La Sarraz, at which place the Hotel de la Gare proved clean, comfortable, and almost absurdly inexpensive. Hair-streaks were just emerging, *Nordmannia* (*Thecla*) *ilicis* and var. *aesculi*, and *Strymon pruni* being taken. *Lycaena alcon* was plentiful, but worn, and not in the marshes, which, at that date, were practically insectless, but on the hills above the marshes. Other "blues" taken were *Agriades thetis* (*bellargus*), *Aricia medon* (*astrarche*), *Polyommatus icarus* (*alexis*) and var. *arcuata*, *Aricia eumedon* and *Plebeius argyrognomon*. The type form of *Coenonympha arcania* was fresh and plentiful, as were *Melitaea athalia* and *M. parthenie*. *M. didyma* was just emerging. *Pararge maera*, *P. egeria*, and *P. achine* were taken, also *Erebia medusa*. Other captures were *Aporia crataegi*, *Pieris rapae*, *Colias hyale*, *Melanargia galathea*, *Epinephele jurtina*, *Coenonympha pamphilus* and *Adopaea flava*.

At Caux, on the 16th, after some little trouble, the very restricted marshy spot where that sprightly little "copper" *Loweia* (*Chrysophanus*) *amphidamas* flies was found, and five specimens taken, all quite fresh. A number of *Chrysophanus hippothoë* were also taken here. Other species taken were *Euchloë cardamines*, *Pieris napi*, *Colias hyale*, *Melitaea athalia*, *M. didyma*, *Brenthis euphrosyne*, light specimens and some bleached, *Coenonympha iphis*, *C. arcania* var. *darwiniana*, *Erebia medusa*, *E. oeme* and *Nordmannia* (*Thecla*) *ilicis*. The "blues," which were not plentiful, were represented by *Polyommatus hylas*, *Agriades thetis* (*bellargus*), *Aricia eumedon* and *Cyaniris semiargus*, and the "skippers" by *Powellia sao*, *Hesperia malvae*, *Adopaea flava*, *Nisoniades tages* and *Cyclopides palaemon*. The Geometer *Scoria lineata* was in profusion, and the following Burnets were taken: *Anthrocera* (*Zygaena*) *achilleae*, *A. purpuralis*, *A. lonicerae*, *A. filipendulae* and *A. transalpina*.

A visit to the Tinière valley next day produced the first *Parnassius apollo* of the season, some *Lycaena alcon* and *Cupido minima*, in addition to many other things previously taken. A few *Adsita* (*Ino*) *statices* were sitting on scabious blossoms, and a huge, pale female *Hamearis* (*Nemeobius*) *lucina* was taken.

At St. Triphon, on the 18th, the insect of the day was *Pararge achine*, which swarmed in the pink of condition. New captures were *Limenitis sibylla*, very fresh *Argynnis aglaia* and *A. niobe* var. *eris*, *Brenthis dia*, *Polyommatus icarus* (*alexis*), and one specimen of *Polyommatus thersites.* A curious teratological specimen of *Coenonympha pamphilus* was taken with a minute left forewing, eyeless and pointed.

The 19th, between Vernayaz and Martigny, produced plenty of new species—*Leptosia sinapis* and ab. *erysimi*, *Melitaea phoebe*, *M. dictynna*, some quite fresh and others worn to rags, *Brenthis daphne* in profusion, *Limenitis camilla*, *Klugia* (*Thecla*) *spini*, and *Nordmannia ilicis*, *Satyrus alcyone*, *Issoria lathonia*, *Loweia* (*Chrysophanus*) *alciphron* var. *gordius*, and *Heodes virgaureae*, the last only just emerging and the var. *gordius* swarming and in perfect condition. The "blues" were conspicuous by their absence, except *Plebeius argus* and a solitary *Polyommatus amanda*. *Hesperia carthami* and *Powellia sao* were well in evidence. The weather, which had hitherto been perfect, now showed signs of breaking, and the next day was a continuous downpour. A walk in the afternoon to Les Grangettes, near the junction of the Rhone with Lake Geneva, a locality for *Brenthis selene*, produced *Brenthis ino* and *Melitaea didyma*, sitting on flower heads in the rain, and allowing themselves to be boxed without trouble, but no *B. selene*.

With the exception of Eclépens, the localities so far visited had been worked from Montreux. A move was now made to St. Maurice, in the Rhone valley. Round about St. Maurice and Lavey les Bains, on the 21st, a dull day, produced only one new species, *Satyrus cordula*. At Sion, on the 22nd, "blues" swarmed, and very little else. Only three species seemed, however, to be present:—*Plebeius argus*, *Polyommatus icarus* (*alexis*) and *P. amanda*.

On the 23rd, a fine day, round the Tour de la Batiaz in the morning, and Vernayaz in the afternoon, produced plenty of good things, although *Melitaea berisalensis*, which was specially looked for, was not taken. New species were *Erebia stygne* (worn), *Pararge megaera*, *Argynnis adippe*, *Polygonia c-album* and var. *hutchinsonii*, *Erynnis lavaterae* and *Hesperia carthami*. *K. spini* and *N. ilicis*, var. *cerri*, were plentiful on the bramble blossoms, their attempted capture resulting, however, in more damage to the silk-gauze net used than to the butterflies. *Brenthis daphne* were plentiful and in good order at Vernayaz, although only one specimen was seen at La Batiaz. The most plentiful "blue" was *Polyommatus hylas*.

The weather now became very unsettled, and even in the Rhone valley it was cold enough to wear an overcoat. On arrival at Brigue, intending to walk over the Simplon, the conditions were so depressing that a change of plan was decided on, and the train taken to Pallanza, on Lake Maggiore. The transformation in the comparatively short time taken to traverse the Simplon tunnel was astounding; on the Swiss side leaden skies and an icy temperature, and on the Italian side cloudless blue skies and brilliant sunshine. The walk from the station at Pallanza Fonda Toce (the mouth of the river Toce) along the bank of Lake Maggiore, to Pallanza, a distance of four miles, is a very interesting and beautiful one. Small sallow bushes on the lake bank were literally hidden under countless swarms of a green beetle, hundreds of which in flight bombarded one's face and filled one's net when attempting to capture a butterfly. The only butterfly in competition with the beetles at this part was *Melanargia galathea* var. *procida*. Further on, near Suna, the path running up the vine-clad slopes soon tempted me, and here *Scolitantides orion* was noted in abundance and in fresh condition. An extremely hot walk up Monte Rosso, a hill with an elusive summit, gave two more new species, *Syntomis phegea*, in swarms, and *Naclia ancilla*.

On the 27th, at Iselle, new species were *Papilio machaon*, *Scolitantides orion*, and *Celastrina argiolus*. The two most plentiful insects were *Parnassius apollo* and *Loweia alciphron* var. *gordius*, both very fine types and in good condition.

The next three days were spent at Simplon village. During the whole time the sunshine was brilliant and the sky cloudless, but an icy north wind blew with terrific force day and night, and insects were few and far between.

In the Laquinthal *Erebia ceto* and *E. mnestra* were about, but, alas, no *E. christi*. M. Morel of Paris, who was staying at Simplon, had not attempted to leave his hotel for eight days, owing to the continuous gale. *Pieris napi* var. *bryoniae* and *Anthocharis simplonia* were taken, and *Coenonympha arcania* var. *insubrica*, but only an occasional var. *darwiniana* until the Bérisal side of the pass was reached where var. *insubrica* was not to be taken. *Brenthis euphrosyne* was fairly plentiful, and many were large black specimens, decidedly larger than the average lowland specimens.

On July 1st the wind dropped considerably, and the walk from Simplon to Bérisal produced a number of new species:—*Erebia tyndarus*, *E. evias*, *E. lappona*, *Brenthis pales*, *Chrysophanus hippothoë* var. *eurybia*, and *Hesperia cacaliae*. At Bérisal I had the pleasure of meeting Mr. Sloper, who had found the season up to that time an extremely poor one.

On the 2nd, between Bérisal and the 5th Refuge, the following new species were taken:—*Parnassius mnemosyne* in plenty in the well-known field behind the hotel, *Hipparchia semele*, *Erebia epiphron*, *Polyommatus escheri*, *Adscita* (*Ino*) *geryon*, and one specimen of *Lycaena sephyrus* var. *lycidas*.

On the 3rd, between Bérisal and the second Refuge, the new species were *Melitaea aurelia* and *Anthrocera* (*Zygaena*) *carniolica*. On this day var. *lycidas* was found in considerable numbers and in very varied condition.

On the 4th I left Bérisal and walked down to Brigue. The new species on this day was *Hirsutina damon*.

On the 5th at La Batiaz and Vernayez, the interval of 12 days from my previous visit had wrought considerable change in the butterfly fauna. The Melitæas and Theclids had quite disappeared and *Brenthis daphne* and var. *gordius* were almost things of the past. On the other hand the Satyrids were in full force as were also *Limenitis camilla* and *Dryas paphia*. The only "blue" seen during the whole day was a solitary specimen of *Polyommatus hylas*. The 7th to 9th were spent at Eclépens. The weather was, however, almost uniformly hopeless. In a few minutes of sunshine, however, on the Lausanne road, where I met Mr. Warren, I took one *Apatura iris*. On the hills a *Limenitis populi*, the only one seen, was missed. In spite, however, of the fact that the majority of the insects taken were sitting about on flowers, bushes, etc., this locality is so prolific that about 160 specimens were taken in this manner. The new species was *Nordmannia* (*Thecla*) *acaciae*. Some beautiful *Parnassius apollo* var. *pseudonomion* were emerging and a number of specimens were taken whilst drying their wings. *N. ilicis* and var. *cerri* were swarming, although mostly worn, and *Lycaena alcon* was also plentiful and some specimens taken were quite fresh.

This terminated a holiday which, in spite of a considerable amount of bad weather, proved both enjoyable and entomologically successful. About 112 species were taken including a few *Geometrae*.

The Terminology of Variation.

By Hy. J. TURNER, F.E.S.

Since the article under the above title was published in the September number of this magazine, Mr. J. H. Durrant has very kindly brought to my notice the fact that the famous Hübner had considered terminology, and in a work of which, I believe, only two copies exist, one of which is in the Library of the British Museum (Nat. Hist.) at South Kensington. Hübner sums up the facts as they presented themselves to him, and puts forth the scheme which is printed below, comparing his scheme of terminology with that, extant in the works, of Linnæus, and with that of Schiffermüller in the Vienna Catalogue (*Wiener Verzeichniss*). It should be noticed that the significations of the terms "genus" and "species" of the three authors are quite different.

The book referred to and the extracts are included below :—

HÜBNER, Jacob.—"Lepidopterologische Zuträge," pp. 1-32, AUGSBURG (Verfasser), 1820.

p. 15 :—

Heer; ORDO. Der Inbegriff aller Schmettlinghorden.
Ordnung S. V. Ordo Linn.

Horde; PHALANX. Eine Abtheilung des Heeres, aus Rotten bestehend.
Gattung S. V. Genus Linn.

Rotte; TRIBUS. Ein Theil der Horde, aus Stämmen bestehend.
† S. V. —Linn.

Stamm; STIRPS. Jede ähnlich gestaltete, zahlreiche Sonderung der Gattungen die ähnliche Familien bilden.
—S. V. Phalanx Linn.

p. 16 :—

Familie; FAMILIA. Ein Theil des Stammes, welcher die Vereine enthalt.
Familie S. V.* —Linn.

Verein; COITUS. Gleichendähnliche Gattungen der Familie.
—S. V.* —Linn.

Gattung; GENUS. Die zusammengehörende Geschlechter begreifend.
Art S. V. Species Linn.

Art; SPECIES. Ein unterschiedenes Ansehen der Gattung.
—S. V. —Linn.

Geschlecht; SEXUS. Der Mann oder das Weib, jeder Gattung.
Geschlecht S. V. Sexus Linn.

Muster; EXEMPLAR. Jeder einzelne Schmettling.
—S. V. —Linn.

Abweichling; VARIETAS. Muster eines ungewöhnlichen Ansehens überhaupt.
Abänderung S. V. Varietas Linn.

Fehlgestalt; DISFORMATIO. Ungewöhnlichen Form der Glieder.
—S. V. —Linn.

Fehlenlag; ABERRATIO. Auschweifende oder nachlässige Zeichnung.
—S. V. —Linn.

Fehlfärbung; ECOLORATIO. Ungewöhnliche Farbe.
—S. V. —Linn.”

The following may be taken as the signification in English of the above terms:—

Ordo = The host of all the Lepidoptera sections.
Phalanx = A division of the Ordo comprising the Tribes.
Tribus = A part of the Phalanx consisting Stirps.
Stirps = All similarly fashioned groups of genera which form similar families.
Familia = A part or section of the Stirps which includes one or more Coitus.
Coitus = Very similar genera of the Family.
Genus = Comprising the sexes which belong to one another (! ! !) [*i.e.*, a pair of one of our "species."]
Species = An integral part (distinct representation) of the Genus.
Sexus = ♂ or ♀ of each Genus (! ! !)
Exemplar = Each single specimen.
Varietas = Example, of a generally unusual appearance.
Disformatio = Unusual form of some part.
Aberratio = Divergent or irregular markings.
Ecoloratio = Unusual colour.

If this matter of Terminology be thoroughly considered, it may be possible to formulate a scheme to place before the Nomenclature Committee and get properly discussed by experts, with the view to the more general adoption of a series of terms, which may be applied and understood with sufficient ease to be generally recognised.

Notes on Pieris manni and other Entomological subjects.

By B. C. S. WARREN, F.E.S.

I. Pieris manni.—Four years ago Professor Reverdin, in an article on *P. manni* (*Ent. Rec.*, vol. xxi., p. 149), gave a list of localities where it was found in Switzerland. Of these, three were in the Canton Valais: Branson, Martigny, and Sierre. It is also to be found at Vernayaz, but I do not think the fact has been recorded.*

On June the 21st, on the path at the foot of the famous cliffs, a few hundred yards from the Vernayaz end, *P. manni* was flying in dozens. A magnificent race, both in size and colouring, the brilliancy of the yellow on the underside reminding one of the colouring of the underside of *P. napi* from Ireland; while, in the majority of specimens, the intensity of the black markings on the upperside far surpassed any *P. manni* I have seen from the south of France.

The ♂ ♂ were flying all along the path, but the ♀ ♀ seldom left the rocks up the hill side, and were consequently much more difficult to catch. On this occasion there were none to be found at Martigny, though a week later they were to be had there too, but never in the same profusion as at Vernayaz.

This was, presumably, the second brood, but out of a great number which I netted, and liberated again, there were only two which one could call var. *rossii*, both ♀ ♀, although several transitional forms were noted in both sexes.

The length of time which the species lasted struck me as being remarkable, extending over two and a half months, my extreme dates being June 21st and September 9th. It is known that the broods of *P. manni* overlap in the summer, but in this instance there was no break whatever in the continual re-appearance of freshly emerged specimens throughout the whole time.

II. Scarcity of the commoner species of Butterflies.—One thing, which will probably have been noticed by most collectors of butterflies, at Eclépens, and in the Rhone Valley, this summer, is how scarce the commoner species have been. Species that one usually finds in hundreds other years not being present in tens this.

Such things as *Agriades thetis*, *Aricia medon*, *Cyaniris semiargus*, *Plebeius argus* (*aegon*), *Rumicia phlaeas*, have been particularly scarce; I have not seen a dozen specimens of *P. argus* (*aegon*), and only two *R. phlaeas* during the whole summer!

The Apaturids, too (not perhaps generally called "common" species, though often so abundant in Central Europe as well to merit the term), were very few and far between at Eclépens, there seldom being more than two or three in sight on the road at the same time; while even *Parnassius apollo* was never really plentiful.

Occasional specimens were all that one saw of *Dryas paphia* and *Melitaea phoebe*, never more than two or three on one day. While on the subject of *M. phoebe*, it may be interesting to add that on June 17th I captured one magnificent specimen of var. *occitanica*, at Sierre, only one other specimen of *M. phoebe* being seen that day.

What has been the cause of this? The weather? In the case of Eclépens possibly too many collectors! The summer has certainly been a bad one here, but it does not seem to have affected the numerous other species, many of which have been exceedingly abundant. It would be interesting to know if this failure among the common species has been noted in other parts of the country too.

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* It is recorded in my "Butterflies of Switzerland," etc., p. 59.—G. Wheeler.

III. Appeal to all Entomologists.—Under this heading, in the June number of the magazine, some gentlemen, on behalf of the Swiss Entomological Association, made an appeal for the protection of certain local species of Swiss butterflies and moths.

While greatly admiring the endeavour to protect these species, one cannot but think that there are others in very much greater need of protection. That such a species as *Erebia christi* could be in any danger of extermination seems impossible; as Mr. Wheeler pointed out, in a footnote to the article, the greater part of its haunts, on the mountain side, between the Laquin Tal and the Laquin Alp are wholly inaccessible.

The case of *Lycaena iolas*, however, is very different. If the Swiss Entomological Association would turn their attention towards preventing the complete destruction of the bushes of *Colutea arborescens* in the Rhone valley they would be doing a good deed.

I am told that the old headquarters of *L. iolas* at Follaterre have been entirely destroyed, and, from what I saw at Sierre, I can quite believe it. One day in the early spring, at Sierre, I came on numbers of bushes of *C. arborescens* hacked to pieces, many of them being cut off about a foot above the ground. Endeavouring to find out the cause of this, I was told that *C. arborescens* is used as a substitute for senna!

I know it is said that the bushes, which mostly grow singly, are so scattered through the Rhone valley that there is no fear of their being totally destroyed; but, on the other hand, when in full bloom in June they are visible a long way off and very conspicuous, and a keen-eyed native, who knew he could make something out of it, would have no difficulty in marking the spot and returning to it in the winter, or late autumn, which is the time when the bushes are cut.

At present *L. iolas* is moderately plentiful at Sierre, but unless something is done to preserve its foodplant, at no very distant time it will cease to exist as a Swiss species, and will disappear from the higher stretches of the Rhone valley, as it has from Follaterre.

Entomology at the British Association.

The Eighty-third Annual Meeting of the British Association for the Advancement of Science was held at Birmingham in the middle of September of the present year, under the Presidency of Sir Oliver Lodge, who took the place of the late Sir William White, the original president for the year.

On the Committee of the Section dealing with Zoology we note the following names of those who are more or less interested in Entomology. The President of the Section was Dr. H. F. Gadow, F.R.S. Among the Vice-presidents, we find Mr. G. T. Bethune-Baker, F.Z.S., Dr. F. A. Dixey, F.R.S., and Dr. P. Chalmers Mitchell, F.R.S., and on the Committee were Prof. W. Bateson, F.R.S., Dr. G. D. H. Carpenter, Prof. G. H. Carpenter, Dr. S. F. Harmer, F.R.S., Prof. E. B. Poulton, F.R.S., Messrs. R. S. Bagnall, Leonard Doncaster, Wilfred Mark Webb, Rev. T. R. R. Stebbing, etc.

Among the numerous papers in the Zoological Section were several devoted to one branch or another of Entomology. Professor Dixey dealt with "The Geographical Relations of Mimicry," pointing out that certain definite schemes of colour and pattern in the wings of butterflies are characteristic of certain definite geographical regions, or even of sections of regions, and instancing his assertion by the well-known combinations of red, black, and yellow Ithomiine, Heliconiine, Danaine, Nymphaline and Pierine butterflies of Central and South America, and by a similar parallelism between the local forms of the African genera *Mylothris* and *Phrissura*. The extreme difficulty of seeking an explanation of these facts in the common influence of geographical environment, made it more probable "in the views of many" that these resemblances are due to the principle of mimicry of one form or the other. But there are sure to be some anomalies to be accounted for, and there may even be mere coincidences due to migration or chance.

Mr. G. T. Bethune-Baker dealt with the question of "The Correlation of Pattern and Structure in the *Ruralidae* group of Butterflies," and made an exhibition of butterflies of allied genera in the *Plebeiinae*, *Strymoninae*, and *Ruralinae*, showing the changes in pattern, colour and structure, and also changes of the same characters between closely allied species in the genera *Plebeius* and *Ruralis*. He also showed a few species of the genus *Acraea*, in which the structure was very similar while the colour and pattern were very diverse, and others again in which the opposite was apparent. With slight diversity of structure the difference would probably be only specific, while if the structure were very diverse it would probably indicate generic difference. But if this apparent want of correlation of colour, pattern, and structure be studied with all available data, it will be found that all genera which group themselves into sections like *Papilio*, *Charaxes*, etc., as far as their colour and pattern are concerned, are also grouped more or less distinctly in their structural details in correlation to their pattern and colour. It would seem that colour and pattern are more sensitive to mutability than structure.

Dr. G. D. H. Carpenter discussed the "Enemies of *Protected* Insects, with special reference to *Acraea zetes*." It was pointed out that "protected" did not mean to imply protection from every enemy. Such an immunity, would mean unlimited increase. Even the honey-bee, well protected as it is, is preyed upon by the bee-eater, and hairy caterpillars are consumed in quantities by cuckoos. The most effective enemies of protected insects, however, are mainly predaceous insects and parasites.

Prof. E. A. Minchin, F.R.S., read a paper on "Sleeping Sickness," a *resumé* of what was known of the cause of this terrible scourge of Africa. It was pointed out that the disease was dependent for its existence on two hosts in succession, a vertebrate (man, etc.), and an invertebrate (the tsetse fly). The vertebrate host was not man alone but largely antelopes as well as ruminants generally; to the latter hosts, however, the organism was innocuous. Various preventative measures had been suggested. If the flies could be wholly destroyed, it was obvious that the disease would disappear. Some would suggest the destruction of all game. Others would protect the wild gallinaceous birds who would reduce the flies to a minimum number, which result would be further aided by the introduction of other species of birds of this family. It was an unquestioned fact that the flies were only found in the vicinity of water.

Professor E. B. Poulton opened a discussion on "Mimicry," by bringing a considerable amount of evidence to support the theories, that certain butterflies and moths unprotected by nauseous body-secretions developed colour and markings resembling more or less closely those of insects generally unacceptable to birds and other enemies as food. The nature of the various injuries commonly found in, or seen to be inflicted upon butterflies was remarked on, and it was pointed out that there was evidence to show that these injuries were especially characteristic of the great groups, which were composed of protected species, the models for mimicry. It was shown by many comparative illustrations and specimens how difficult and practically impossible it was to explain the resemblances as due to the sole influence of natural environment.

Mr. R. S. Bagnall read a short paper on "A Chalcid Parasite on Thrips," giving also lantern illustrations. He recorded a Chalcid found in association with various species of Thysanoptera of the Sub-order, *Terebrantia*, from North Devon, Oxford and the N. of England. The insect was apparently referable to *Thripoctenus russelli*, Crawford, a genus and species recently described from N. America and not hitherto recorded from Europe, and reared from various Terebrantian Thrips. It was pointed out that this discovery was of much economic importance on account of the range of its hosts.

Mr. R. S. Bagnall read a second paper discussing "The Systematic Position of the Order Protura." The literature of this recently diagnosed and anomalous order of Arthropods was outlined, and the views of various authorities as to its systematic position were given. Incidentally he deprecated the use of the term "Myriapoda" to represent what was not a class but a convenient assemblage of Arthropods really somewhat widely separated in modern classification. The view was supported that the Protura, though they had twelve abdominal segments, with the sexual opening far back, were truly Hexapod. As in the Chilopods, especially in the *Lithobiidae*, the thoracic and abdominal segments of the Protura numbered fifteen, which is the number of body segments in the genus *Lithobius*, and arrived at this number from a nine segmented form, by intercalation of a segment at a time, between the ultimate and penultimate segments. It followed from this that the Class Insecta should be divided into two Sub-classes, the one for Protura (with anamorphosis) and the other for all other Orders (having no anamorphosis) including Thysanura and Collembola. The author considered that the so-called *pedes abdominales* were not true vestigial legs, but specially modified organs to compensate the lack of the front pair of legs which are used as antennæ, and he pointed out, that though the creature increased its body segments by intercalation, the segments so added were not leg-bearing segments.

Professor Poulton read a communication from Mr. W. A. Lamborn, Southern Nigeria, containing an "Observation on Marriage by Capture by a West African Wasp. A possible explanation of the great variability of certain secondary sexual characters in males." A large clay nest was found, on which was sitting a wasp with enormously developed mandibles, while two others were flying around, but were evidently terrorised when they came close by the first. At a small hole in the nest could be seen an imago cutting its way out, which the first male was guarding. This supposed female was seized by the male immediately on emergence, but was lost in the attempt at capture. Other male wasps appeared subsequently, and two were secured, but neither of them possessed such enormous mandibles as the first one. The species is *Synagris cornuta*. It was suggested that these growths are a disadvantage in obtaining food, etc., and that while the individuals with larger processes have the advantage at the beginning through sexual selection, the individuals with much less developed mandibles have the advantage later, from the greater facility they possess in obtaining food and prolonging their life; of course assuming that the emergence of the females covers a sufficiently long period.

Professor Poulton, in a short paper, dealt with the various interpretations given by authors to the word " Mutation," as applied to variation in species. Waagen, in 1869, used the term to express a simultaneous and probably gradual change in a relatively large proportion of the individuals of a species. De Vries uses the term "mutation" to express a single discontinuous variation, and asserts that evolution progresses discontinuously by means of "mutations." Bateson, Punnett, Shipley, and others have placed emphasis upon these mutations with the added idea that they are permanent and transmissible. In conclusion various practical suggestions were made as to how the existing hopeless confusion in regard to the significance of this term could be set right.

Several other papers were read but details of them are not to hand. Sir George Kenrick discussed " The Classification of Pierines," Mr. W. Bowater gave an address on the " Heredity of Melanism in the Lepidoptera," and Mr. J. L. Wadsworth communicated a paper " On the Oviposition of a Trypetid Fly on *Centaurea nigra*."

Next year the Meeting will be held in Australia, and the President-elect is Prof. W. Bateson, F.R.S. It was also agreed that in the following year, 1915, the meeting should take place in Manchester.

(Mr. G. T. Bethune-Baker and Mr. R. S. Bagnall have kindly furnished most of the details from which the above report has been compiled.)—H. J. T.

SCIENTIFIC NOTES AND OBSERVATIONS.

The Coloration Problem.—I have only just seen the series of articles by Mr. Parkinson Curtis on the " The Coloration Problem," which have been appearing in the *Entomologist's Record* during the last few months, and as I am leaving England for a turn of foreign service in a few days, I have not only no time to reply to them, even had I wished to do so, which is doubtful as I dislike argument, but no time to study them. I can only thank Mr. Curtis for this extremely interesting article and for his own observations. I hope he is not under the impression that I consider all mimetic resemblances to be the result of climatic or geographical conditions, as that would be distinctly erroneous; neither do I consider either the Batesian or Müllerian hypothesis as " bad." On the contrary I recognise their value as working hypotheses, but I cannot, for reasons I have elsewhere given, accept them, and I have, somewhat unwillingly, to retain my "Scotch attitude."

I by no means, accept the proposition that no other theory can possibly supplant the present ones, or that no other theory is possible, on the contrary, I rather look forward to the time when some future Darwin will give us the true explanation of these mimetic resemblances and some future Huxley exclaim "how extremely foolish of us not to have thought of that before."—(Lt.-Col.) N. MANDERS (R.A.M.C., F.E.S.).

THE "STRIDULATION" OF CYCHRUS ROSTRATUS.—A chance remark of Mr. J. Collins of the Hope Department, University Museum, Oxford, who said he had caused dead examples of *Cychrus rostratus* to "stridulate" by pressing the abdomen, tempted me to look up my published notes on Coleoptera, when I was surprised to find that I had not recorded certain views on this question that occurred to me as far back as the spring of 1907.

Early in 1906 (*Ent. Record*, 1906, p. 73) I published a note on the stridulation of *Cychrus*, when I said the noise was caused by muscular movements of the abdomen near the apex, and that if one holds the beetle by the fore-finger and thumb, the thumb on the underside of the abdomen and the finger pressing the elytra down, it seems to lose its power of producing sound. I then came to the conclusion that the stridulation of the species was caused by friction between a certain part of the abdomen and the elytra. In the same note I recorded the stridulation of four females and the non-stridulation of two males.

No true stridulating organs have been found.

In the spring of 1907 I found two females of *Cychrus* at Corbridge-on-Tyne and repeated the observations. The "stridulating" sound was distinctly caused by an upward muscular movement of the abdomen, but this movement seemed to me to be a wave movement tending distally, and, remembering the structure of the elytra which are soldered together and have the edges laterally folded over the abdomen, it immediately occurred to me that the sound was not produced by stridulation but by the compression of air between the upper surface of the abdomen and the elytra, and its subsequent ejection. This is, I believe, the true explanation of the "stridulation" in *Cychrus rostratus*, and one which satisfactorily explains the lack of stridulating surfaces, though it does not account for the female alone producing the sound, if indeed, the property is vested in the one sex, as my previous observations would seem to suggest.—RICHARD S. BAGNALL (F.E.S.), Oxford. *November* 19*th*, 1913.

NOTES ON COLLECTING, Etc.

MANDUCA (ACHERONTIA) ATROPOS AT CHICHESTER.—A specimen of *Manduca* (*Acherontia*) *atropos* was brought me on October 17th last. It is a female, small, but perfect, and of dark, handsome colours and markings.—JOSEPH ANDERSON, Chichester.

COLIAS EDUSA IN LATE OCTOBER.—It may be of interest to some of your readers to note that I saw a fresh male *Colias edusa* on October 25th last, flying along the road between Bramber and Henfield, Sussex, but having no net was unable to secure it.—H. BAKER-SLY (F.E.S.), Horley, Surrey, *November*. 1913.

CURRENT NOTES AND SHORT NOTICES.

Parts IV. and V. of the *Annales de la Société Entomologique de Belgique*, 1913, contain a number of papers on Coleoptera, mainly exotic, one each on Hemiptera and Ants, and, by Baron de Crombrugghe de Picquendaele, a series of notes on the Micro-lepidoptera of Belgium, supplementary to his *Catalogue raisonné.*

The study of those extremely minute and wonderfully beautiful Hymenoptera, the *Mymaridae*, parasitic in the ova of insects, in which Messrs. Fred. Enock and C. O. Waterhouse are the pioneers, has been taken up in Australia by Mr. A. A. Girault, who contributes further descriptions of species obtained by him in Queensland to the July number of the *Canadian Entomologist.*

In the *Entomologist* for October, Mr. F. W. Frohawk and the Hon. N. C. Rothschild give full details of the life-history of the sub-sp. *suwarovius* of *Melanargia japygia;* Mr. J. C. Moulton gives an account of a recent visit to Malacca, one of Wallace's famous hunting grounds; and Mr. W. G. Sheldon commences an account of his 1913 visit with Mr. A. H. Jones to the Albarracin district of Spain.

The current issue of the *Berliner Entomologische Zeitschrift* (1 and 2) contains the following articles, among other shorter contributions, "The Orthopterological Results of a Journey in Carinthia and Istria (1912)," by Dr. Willy Ramme; "The New Lepidopterological Nomenclature and the Hubnerian Genera names, especially of the *Noctuidae*," by Prof. Dr. V. Linstow; "The Marshy-woodland area of Pommerania," by U. von Chappuis; and "A Study of the *Tenthredinidae*," by V. Nicholaus Loth.

In the *Entomologist* for September, Mr. Frohawk gives details of the "Life-history of *Brenthis* (*Argynnis*) *hecate*," and of the "Life-history of *Adopaea flava* (*linea*);" Mr. W. J. Lucas contributes "Notes on the Orthoptera of Devon and Cornwall;" and Mr. Claude Morley writes on the "*Ichneumonidae* in the Dublin Museum."

In the *Journal of Entomology and Zoology* (Claremont, California) for June Prof. August Busck gives an account of some new species of Micro-lepidoptera from California and expresses the hope that ere long he may be able to give a comprehensive paper on the Micro-lepidoptera of the State. Among the species described are two new species of *Coleophora* and three of *Gelechia.*

The 43rd *Annual Report* (1912) *of the Entomological Society of Ontario* is to hand. It contains the usual summaries of the work of the various local branches, and communications on the insects of the year from the Ottawa and Toronto districts. In the former district only *Malacosoma disstria* (the Forest Tent Caterpillar) seemed to have outrun its natural controls, and in some districts enormous damage was done to poplar and birch, as well as to many other trees in less amount. In addition to the lists of insects noted in all Orders, the Report contains some interesting papers, including:—The Annual Address by the President, Dr. E. M. Walker, dealing mainly with "The Faunal Zones of Canada;" "Review of Entomology relating to Canada," by Dr. Gordon Hewitt; "The Rise in Public Estimation of the Science of Entomology," by the Rev. T. W. Fyles; "Bumble-bees and their ways," by F. W. L. Sladen, who has now taken up entomological work under the Canadian Government; and "Progress of the

Introduction of the Insect Enemies of the Brown-tail Moth (*Euproctis chrysorrhoea*, L.) into New Brunswick," by J. D. Tothill.

Fascicule 4 of volume II. of the *Bull. Soc. Lep. Genève* has been issued with the index completing the volume and the *Compte Rendu des Séances* for 1912. There are three plates two of which are drawn and coloured by M. J. Culot in his usual exquisite style. One is a plate of local forms and aberrations of Western Palæarctic butterflies, the other contains a series of beautiful figures of the species illustrating a further paper by Dr. Reverdin, "Notes on the genera *Hesperia* and *Carcharodus*." M. Marcel Rehfous contributes an article, "Contribution to the study of *Lycaena cyllarus*, Rott., Biological Observation;" Prof. Chas. Blachier, the Editor, writes a series of "Notes on some butterflies of Algeria and Morocco;" and Dr. Arnold Pictet gives accounts at considerable length of his (1) "Experiments on the hibernation of *Lasiocampa quercûs*," (2) "Experiments on the resistance to cold and longelivity of Lepidoptera, in the adult stage." The *Bulletin* is certainly one of the best of the continental productions.

The *Entomological News* for October is a very interesting number. It contains a plate of two figures of abnormal specimens of *Samia*, the aberration of *S. cecropia* having a fifth wing. It was a bred specimen, the supernumerary wing being quite independent and a complete repetition of the left secondary wing, markings and all. Among the more attractive papers are a continuation of A. A. Girault's "Fragments on North American Insects," "The Butterflies of Omaha," by R. A. Leussler, "Some Beetles reared from a Dead Elm Stick," by Dayton Stoner, "Notes on some N. American *Noctuidae*, by F. H. Wolley-Dod and "Some Ticks from Florida" by F. C. Bishop.

In the last two parts of the *Ent. Mitt.* (September and October) further considerable instalments are made in the Entomological Fauna of Formosa; G. Warnecke gives "Notes on a melanic form of *Cymatophora or*," from the neighbourhood of Hamburg-Altona, and named ab. *albingensis:* Fritz Wagner complete his account of the butterflies of Sary-Dschas (Central Asia); Dr. L. G. Courvoisier writes on "A few new or little known *Lycaena* Forms from the Palæarctic Region"; E. Meyrick describes a small collection of Micro-lepidoptera made by M. von O. Leonhard, in Tunis.

In the *Ent. Mo. Mag.* for August, September, and October, a long series of "Notes on Lepidoptera from Gibraltar and the surrounding country," is contributed by Capt. J. J. Jacobs, R.E. (retd.), F.E.S.

In the *Ent. Mo. Mag.* for October, Mr. Norman H. Joy announces two species of *Xantholinus* as new to science, *viz.*, *X. substrigosus*, in Mr. Tomlin's collection labelled Peckham, and *X. scoticus* from Inverness-shire and Sutherland.

We are much pleased to hear that Mr. H. Eltringham, M.A., F.E.S., who is well-known for his able "Monograph of the genus *Acraea*," published in the *Transactions of the Entomological Society of London*, has just received the degree of D.Sc. at the Ancient House of Congregation, Oxford. The above named work and various contributions which he had made to the Theory of Mimicry were submitted to the examiners.

Dr. Burr has forwarded an extremely good sample of the rubbish that is consistently dealt out to the public in our daily newspapers on all matters of natural history. There are four illustrations, headed

"Fierce Battles of the Insect World." (1) *Mantis religiosa*, L., fighting with the grasshopper *Platycleis grisea*, Fab. This is entitled "Rearhorse or mantis versus grasshopper." (Dr. Burr suggests that "rearhorse" is probably an Americanism.) (2) Cicada emerging from nymph. This illustration is entitled "Giant fly attacking a Bee." (A delicious instance of the saying "A *little* knowledge is a dangerous thing.") (3) Two mantids fighting, entitled "Hand to hand encounter between two rear horses." (4) Evidently the same two insects as the last, but styled "Winged ant grips rearhorse across the body." We wonder from whence the *Daily Mirror* got the illustrations; no doubt "they are considered by the Art Editor to be educational," as Dr. Burr remarks. Dr. Burr also informs us that *Platycleis grisea* is a strong and active carnivore, but no match for a big mantid, and that he has seen a nymph of *M. religiosa* dragging about a full grown *P. grisea* tight in his claws.

On November 13th, Professor W. Bateson, F.R.S., gave an address at the South London Entomological and Natural History Society on the "Problem of Species which overlap Geographically," illustrating his remarks with numerous specimens and lantern slides. From the instances given, chosen chiefly from birds and lepidoptera, the fact was emphasised that it was very difficult to find a definite intermediate form arise in the area of the overlapping of two definite forms. The results of the crossing of the forms were almost invariably of all degrees of intermediate blending, of the species, or form characters. The question to be discussed was, "What keeps geographical forms, existing in apparently similar areas, so definitely apart?"

REVIEWS AND NOTICES OF BOOKS.

THE LIFE OF THE FLY.—By J. HENRI FABRE. Price 6s. nett. Published by HODDER AND STOUGHTON, WARWICK SQUARE, E.C.—As most of our readers are already acquainted with previous works of M. Fabre, the mere notification of the appearance of the above volume will be sufficient to insure them procuring copies.

Those who wish to know more of the talented author will be pleased to learn that, interspersed among the other matter in this book, are some chapters of autobiography. The following essays, among others, are incorporated:—The Anthrax; Larval Dimorphism; Heredity; The Pond; The Caddis Worm; The Greenbottles; The Grey Flesh-Flies; The Bluebottle; The Maggot; A Parasite of the Maggot; Insects and Mushrooms.

The ability of the writer in presenting accurately the facts of science in the simplest form, is well illustrated in the chapter on "The Anthrax," p. 45, *et seq.*, where he treats of histology and histogenesis (skilfully avoiding these terms), in such a way that any well-educated lad could quite easily understand. He says somewhere in the chapter on "The Harmas" (p. 5): "Well, if I write for men of learning, for philosophers . . . . I write also, I write above all things, for the young. I want to make them love the natural history which you make them hate; and that is why, while keeping strictly to the truth, I avoid your scientific prose, which too often, alas, seems borrowed from some Iroquois idiom!"

The possession of this book will enable the lover of Natural Science to make his investigations at first hand, with M. Fabre as his guide; and happy he with such a one for his mentor.—H. E. P.

OBITUARY.

Dr. Arnold Pagenstecher.

Dr. Arnold Pagenstecher, who, we regret to say, passed away on June 11th, 1913, was born at Dillenburg on December 25th, 1837. He was educated at Wiesbaden, and studied medicine at the universities of Würzburg and Berlin. For a short time he assisted at the famous institute for diseases of the eye at Wiesbaden, but in 1863 he became a specialist for troubles of the ear. In the same year he married Miss Ernestine Roessler, by whom he had four children. Pagenstecher was a man of great activity, for besides having a large practice he did a great deal of work on the various municipal committees of the town of Wiesbaden and yet he found time for the study of natural history. From his student days he was an active member of the Nassau Natural History Society and was elected Secretary in 1882, when he also became Editor of the Transactions and Inspector of the Museum at Wiesbaden. He was corresponding member to several societies, such as the Senckenberg in Frankfort, and was honorary member of the Iris Entomological Society of Dresden. In 1876 Pagenstecher was made a Sanitätsrat on account of his medical eminence and twenty years later received a title of further distinction, Geheimer Sanitätsrat. On his 70th birthday, the authorities of Wiesbaden, in order to show their appreciation of their fellow townsman, conferred on him, among other honours, the freedom of that town. As it is with so many entomologists, Pagenstecher commenced to collect the Lepidoptera in his boyhood and the love of these insects never left him. He made a large collection of European Lepidoptera and, when the writer first met him in 1879, he had also collections of the *Papilionidae* and Catocalids of which he seemed particularly fond. Later he especially studied the Lepidoptera of the Malayan Archipelago and published several papers describing new species, etc. In 1893, he published a paper on East African Lepidoptera. Later he wrote the monograph on the *Libytheidae* and many other papers, and in 1909 appeared his larger work, *Die geographische Verbreitung der Schmetterlinge*. It may interest us to know that Dr. Pagenstecher spoke English well, and once, at least, visited London. The writer went with him to the Zoological Gardens, with which he was delighted. He was of a singularly genial and amiable disposition, and on several occasions a real friend to the writer. He will be much missed in the entomological world and especially in Wiesbaden. (A few items in the above have been culled from the *Ent. Zeit.*, Frankfurt.)—A.S.

CORRECTION.—In my note on Coleoptera in Lundy Island (*anteà* p. 266) I referred to the number of Common Gulls nesting there. This was an inadvertence. The birds were Herring Gulls. As is well-known, the former species does not breed in England. I am obliged to Dr. Joy for having called the attention of my friend Mr. Donisthorpe and myself to this inaccuracy, and am glad to correct it. Dr. Joy states that the Common Gull only once bred on the Farne Islands.—R. S. MITFORD.

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